EUROPEAN COMMISSION
DIRECTORATE GENERAL JRC
JOINT RESEARCH CENTRE – ISPRA
Space Applications Institute
Agriculture and Regional Information Systems Unit

6th Conference on
Control with Remote Sensing of Area-based Subsidies
Jurys Conference Hotel, Dublin, Ireland
16-17 November 2000

Final programme
Thursday, 16 November 2000, Morning

08:30-09:30	**Registration**			
09:30-10:00	**Opening address**	Opening address	M. Byrne	Head Finance Division DAFRD
		Welcome	J. Meyer-Roux	Vice-Director of JRC-SAI
		Introduction	G. Lemoine	JRC Control Team
10:00-11:00	**Session 1**	Summary Statistics and quality control	P. Åstrand *et al*	JRC Control Team
	Campaign review	Acquisition and delivery of satellite data in 2000	G. Peroni	JRC Control Team
		New issues in the 2001 campaign	G. Lemoine	JRC Control Team
11:00-11:30		*Coffee break*		
11:30-12:30	**Session 2:**	Parcel measurement, a closer look at tolerance parameters	O. Léo	JRC MARS Project
		Methodology for control site selection	E. de Laroche	ONIC (F)
	Technical issues	Measures for the control of durum wheat	J. Pinto	INGA (P)
		Land Eligibility Reference Checks - UK Position	B. Bibby	MAFF (UK)
12:30-14:00		*Buffet lunch, Jurys Conference Hotel*		

EUROPEAN COMMISSION
DIRECTORATE GENERAL JRC
JOINT RESEARCH CENTRE – ISPRA
Space Applications Institute
Agriculture and Regional Information Systems Unit

6th Conference on
Control with Remote Sensing of Area-based Subsidies
Jurys Conference Hotel, Dublin, Ireland
16-17 November 2000

Final programme
Thursday, 16 November 2000, Afternoon

14:00-16:00	**Session 3:**	Overview of the RSC2000 Pilot Evaluation Tests	L. Karamali	JRC Control Team
		Ortho-correction and comparison to ortho-photos	T. Kukuk	GAF (D)
		Ortho-rectification of IKONOS CARTERRA Geo images	L. Tournas	Eratosthenes (GR)
	Use of	Multitemporal Ikonos Data: Results from Classification and Interpretation of some Segments (Areas) in Reggio Emilia Province – Italy	S. Lorenzini	Consortio ITA (I)
	IKONOS data	Control of area-based subsidies in scattered sites: Use of IKONOS Imagery vs. Aerial Photography - a First Approach	J-L. Tirado Valencia	DAP (S)
		IKONOS and Agri-Environmental Measures (AEMs) - Preliminary Results from two Ongoing Pilot Studies in Italy and England	N. Watson, P. Astrand	FRCA (UK), JRC MARS Project
		Status Overview of Space Imaging Europe Activities and IKONOS Data Supply	E. Varela	SIE (GR)
16:00-16:30		*Coffee break*		
16:30-17:30	**Session 4:**	Posters and software demonstrations	Various	*(see list on last page)*
18:30		Transport from Jurys Hotel to Dublin Castle		
19:00-23:30		**DAFRD hosted Centenary Reception and Dinner at Dublin Castle**		
23:30		Transport back to Jurys Hotel		

EUROPEAN COMMISSION
DIRECTORATE GENERAL JRC
JOINT RESEARCH CENTRE – ISPRA
Space Applications Institute
Agriculture and Regional Information Systems Unit

6th Conference on
Control with Remote Sensing of Area-based Subsidies
Jurys Conference Hotel, Dublin, Ireland
16-17 November 2000

Final programme
Friday, 17 November 2000, Morning

9:00-10:30	**Session 5:**	Introduction	J. Masson	JRC Control Team
		Status of IACS implementation in the Czech Republic: Objectives and Methodology Evaluation of the IACS pilot project	J. Kolar	GISAT (CZ)
	Candidate Member States	Results of the Hungarian Remote Sensing Controls for national subsidies in 1999-2000, using EU harmonised methods	G. Csornai	FOMI Remote Sensing Center (HU)
		The Integrated Information System for Agriculture in Poland	T. Stuczynski	IUNC, Pulawy (PL)
10:30-11:00		*Coffee Break*		
11:00-11:45	**Session 5**	Use of orthophotos and digital cadastral maps for field inspection in Slovenia	P. Marolt	Inspectorate for Agriculture, Fisheries and Hunting (SI)
	(continued)	Results of the EU PHARE Lithuanian pilot project on the Land Parcel Identification System	V. Paskevicius	Rural Development and Information Center (LT)
11:45-12:30	**Session 6**	Introduction	J. Stakenborg	DG AGRI A-I-2
	Novel developments	A project on the introduction of GIS in IACS in Sachsen Anhalt	A. Hagen	MRLU, Sachsen-Anhalt (D)
	In IACS and Control	Introduction of GIS in IACS, the Irish system	J. Creaner, E. Minogue	DAFRD (IE)
12:30-14:00		*Buffet lunch, Jurys Conference Hotel*		

EUROPEAN COMMISSION
DIRECTORATE GENERAL JRC
JOINT RESEARCH CENTRE – ISPRA
Space Applications Institute
Agriculture and Regional Information Systems Unit

6th Conference on
Control with Remote Sensing of Area-based Subsidies
Jurys Conference Hotel, Dublin, Ireland
16-17 November 2000

Final programme
Friday, 17 November 2000, Afternoon

14:00-15:30	**Session 6 (cont.)**	Interactive Application Forms with GIS - An ArcIMS application	P. Ralsberg *et al*	SJV (S)
	Novel developments	Perspectives of wider usage of GIS and orthophotos in relation to the Implementation of IACS system in Poland	R. Lach *et al*	Baltic Centre of GIS (PL)
	In IACS and Control	Land parcel management and Remote Sensing control using Web enabled technologies	L. McGeown *et al*	e-Spatial Solutions (IE)
		Advances in open system solutions for distributed control tasks	G. Lemoine	JRC Control Team
15:30-16:00		Round table discussion, Conference closure	All	
16:00-16:30		*Coffee break*		

Poster contributions: Baltic Centre for GIS (PL); Consorzio I.T.A. (I); DAP (E); e-Spatial Solutions (IE); Ekotoxa Opava S.R.O. (CZ); Elleniki Photogramm. (GR); Estereofoto LDA (P); FÖMI, Remote Sensing Centre (H); GAF (D); Geosys (F); GISAT (CZ); Landwirtschaftskammer für das Saarland (D); Mallon Technology Ltd. (IE); Ministry of Agriculture and Regional Development (H); Ministry of Agriculture and Rural Development (PL); Olsztyn University (PL); Soil Science and Conservation Research Institute (SK); Space Imaging Europe (GR); The Icon Group (IE); Tragsatec (E)

Software demonstrations: Baltic Centre for GIS (PL); CCIA (I); e-Spatial Solutions (IE); GAF (D); GISL (UK); MAFF (SL); Mallon Technology Ltd. (IE); MAPS Geosystems (D), Ministry of Agriculture and Food (S); Ministry of Agriculture and Rural Development (PL); Satellus AB (S)

6th Conference "Control with Remote Sensing"

Dublin, Ireland, 16 & 17 November 2000

Introduction

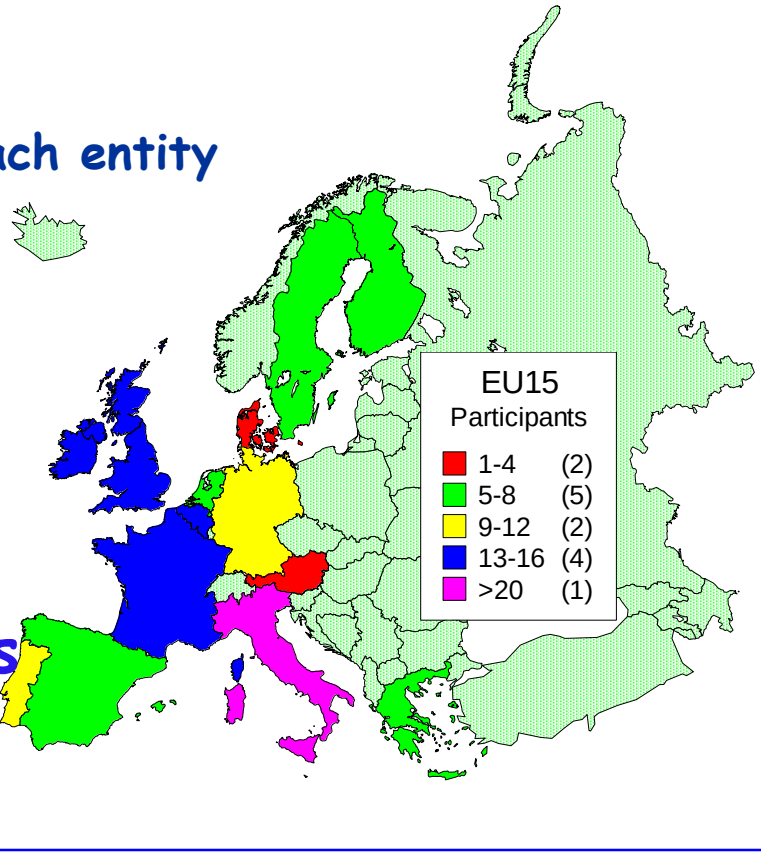
- Context and objectives of the conference
- The participants
- The programme
- Practical information

Context and objectives of the conference

- 2000… the 6th Annual Conference
  - ➔ the 7th year of Control with Remote Sensing
  - ➔ the first time co-hosted outside Italy
  - ➔ at the occasion of DAFRD Centenary
- 2000… consolidation and change:
  - ➔ CwRS firmly established in participating MS
    - number of sites slightly increased
    - little change in CwRS contractors
  - ➔ But, increasingly anticipating technology change
    - increased use of ortho-imagery (IKONOS, tolerance related)
    - pilots on innovative distributed system solutions

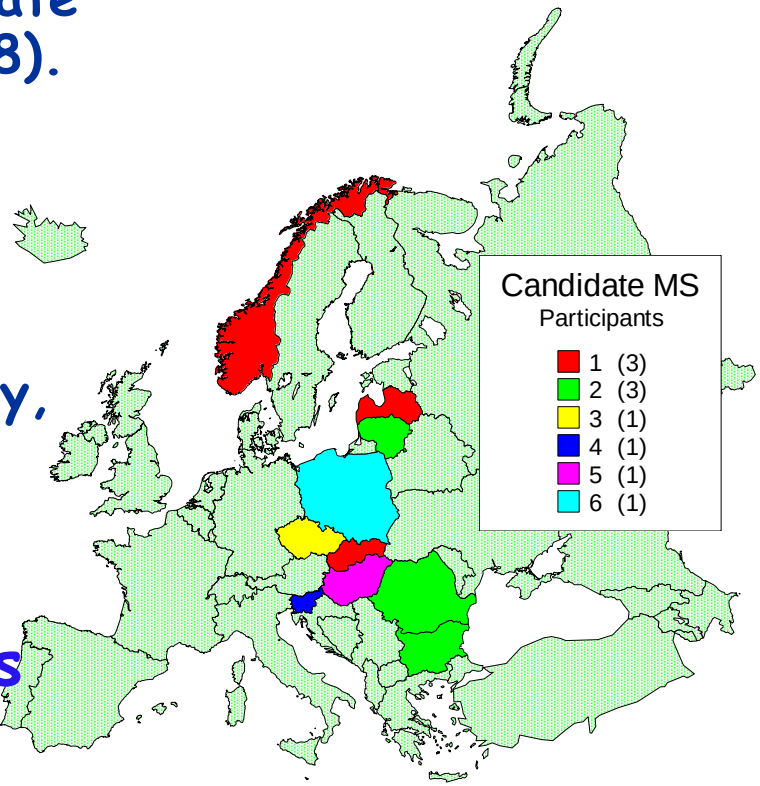
Introduction: the participants

- ±170 participants
  - 148 (95), 115 (96), 126 (97), 140 (98), 135 (99)
  - over 180 registrations
  - limited by conference facilities
  - at least 1 representative from each entity
- EU15: all except LU
- All Nat. Admins ≥ 2
- > 40 companies
- Commission Representatives
  - COM: 19 (incl. translation)
  - 5 Repr. DG-AGRI A-I-3



Introduction: the participants

- In 2000, as active participants
  - 27 representatives of 9 candidate member states (1999: 11 and 8).
- 2 Baltic states
  - Latvia, Lithuania
- 7 Central European states
  - Poland, Czech Republic, Hungary, Slovakia, Slovenia, Romania, Bulgaria
- Both Nat. Admin. Delegates and commercial companies
- Please contact *Josiane Masson!*



JRC Team structure

➔ A group of 5 people

WP 1000: Control with Remote Sensing

GUIDO LEMOINE

- *Guido PERONI: Image ordering (until 2/2001)...*
- *Pär ÅSTRAND: Geometry QC, Aerial photography*
- *Lia KARAMALI (Doctorate) R&D*
- *Tore TOLLEFSEN: QC, statistics...*
- *Hervé KERDILES: QC, IT, R&D (from 12/2000)*
- *TBD: image ordering, candidate MS*
- *Others: E. v.d. GOOT (IT), E. SCHEFFER (Archives)...*

MARS Project - Olivier LÉO

ARIS (Agriculture and Regional Information Systems) unit

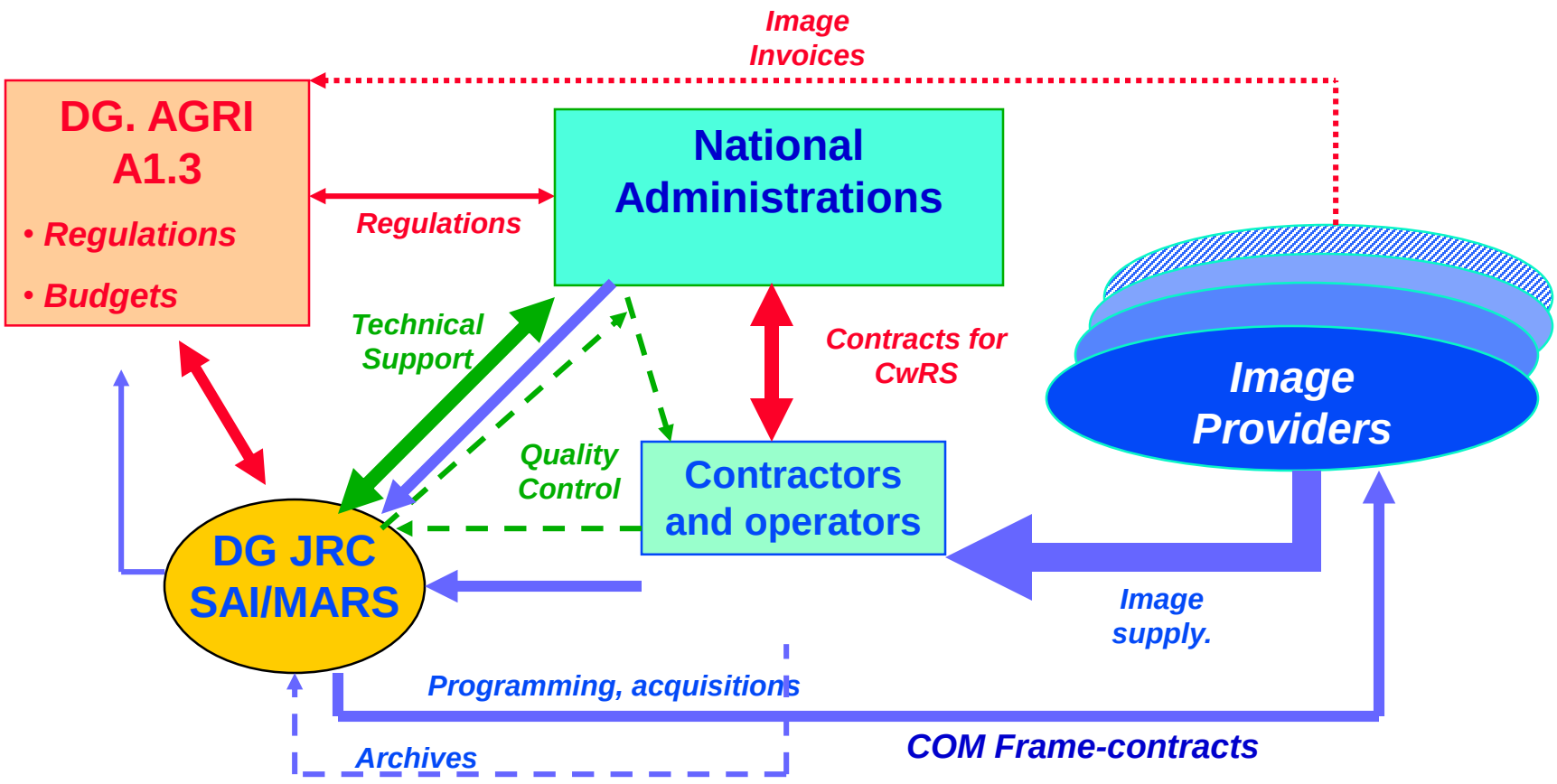
SAI - Space Applications Institute

D.G. JRC

5th Framework programme

Organisation of CwRS

➔ General organisation of Control with RS



The role of the JRC

➔ Objectives of the technical support

- Monitor the implementation of methods and techniques conform the regulations
- Maintain, at the European level:
  - Homogeniety of the methodology
  - Coordinate the common technical documents (e.g. ITT, recommendations)
  - Organise technology exchange…
- Follow and test enhancements and new technology...

➔ The implementation of the technical support

- Technical visits and report analysis…
- Quality Control
- Conferences, workshops
- Meetings with DG AGRI A-I-3, Nat. Admin, contractors

Introduction: the programme

➔ **Conference: 6 sessions:**

THURSDAY

- Session 1: Review of the 2000 campaign, new issues
- Session 2: Technical issues
- Session 3: IKONOS experiments and results
- Session 4: Posters and computer demonstrations

FRIDAY

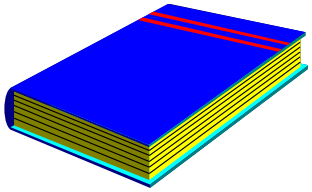
- Session 5: Candidate member states
- Session 6: Novel developments in IACS and Control
- ROUND TABLE

Introduction: the programme

- 25 presentations
- 20 Posters
- 10 computer demonstrations

- Proceedings in March 2001

Please provide (to guido.lemoine@jrc.it)



- a paper copy of your presentation (translation)
- a digital copy for the proceeding (e-mail or ftp)

Introduction: Practical Information

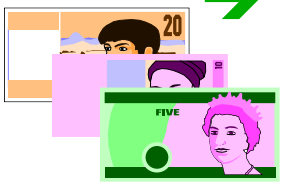
➔ **Reimbursement** (Nat. Admin. Delegates, invited delegates from Candidate MS, invited experts)

Please go to registration desk:

Francesca PINOTTI

➔ Please bring your

- Pre-filled reimbursement forms
- ticket and BOARDING PASS (for copy).



➔ Please make sure to pay IE£ 40 registration fee

- Good for lunches on Thursday and Friday
- You will receive a receipt

➔ Please check and update list of participants

Introduction: Practical Information

➔ Jurys Conference Hotel

➔ All conference presentations
- Elm & Oak (plenary session)
- Cedar poster room

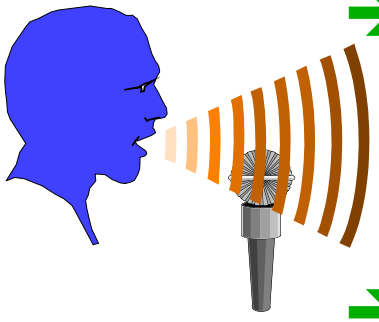
➔ Coffee
- Today: near Ball room (opposite registration)
- Tomorrow: near Poster room

➔ Lunch
- Today: in Ball room (opposite registration)
- Tomorrow: "split" in two rooms (to be arranged)

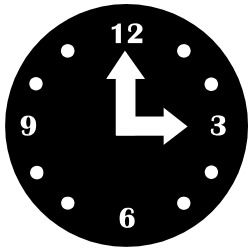
Introduction: Practical Information

- Poster room
- Panels indicated
  - Thematic division
  - Re-arrange on mutual agreement
- Computer set-up
  - Tables and sockets available
  - May need some time until Noon
- Bar?
  - Could be opened from 16:00 - 17:30
  - Direct cash payment

Introduction: Practical Information



- **Translation**
  - 5 spoken languages: EN, FR, DE, ES, IT
  - 3 translated languages: EN, FR, DE
  - please be careful with the equipment
- **We plan to follow the schedule...**



- **Presentations, posters and demos**
- **Coffee break and lunches**

- *Please, switch off cell phones*
- *Please do not use Internet computers for E-mail*

Introduction: the Dinner

- ➔ DAFRD Centenary Celebration
- ➔ All participants invited, show hands
- ➔ Bus transport Jurys - Dublin Castle

Space Applications Institute

CHANGES IN QC METHODOLOGY
Alphanumeric database

- Minor changes in the Access database format and structure
  - ⇨ Based on adaptations to QC data actually delivered by contractors in 1999
- Simplification of data at the parcel level
  - ⇨ Former tables T3 (PARCELID) and T4 (CROSREFPAR_ILOT) merged into one table (CROSREFPAR)
  - ⇨ This CROSREFPAR table makes the link between the contractor's IDPARCEL and the reference parcel ID (i.e. parcel in the LPIS)
- The link between declared parcels and observed parcels is no longer necessarily unique
  - ⇨ The tables of declared parcels and observed parcels do not have to have the same number of records
- Seven additional parameter tables
  - ⇨ Information on groups by scheme, codes used for group and dossier diagnostics, etc.
- Works well !
  - ⇨ Data delivery from contractors conforms to specifications

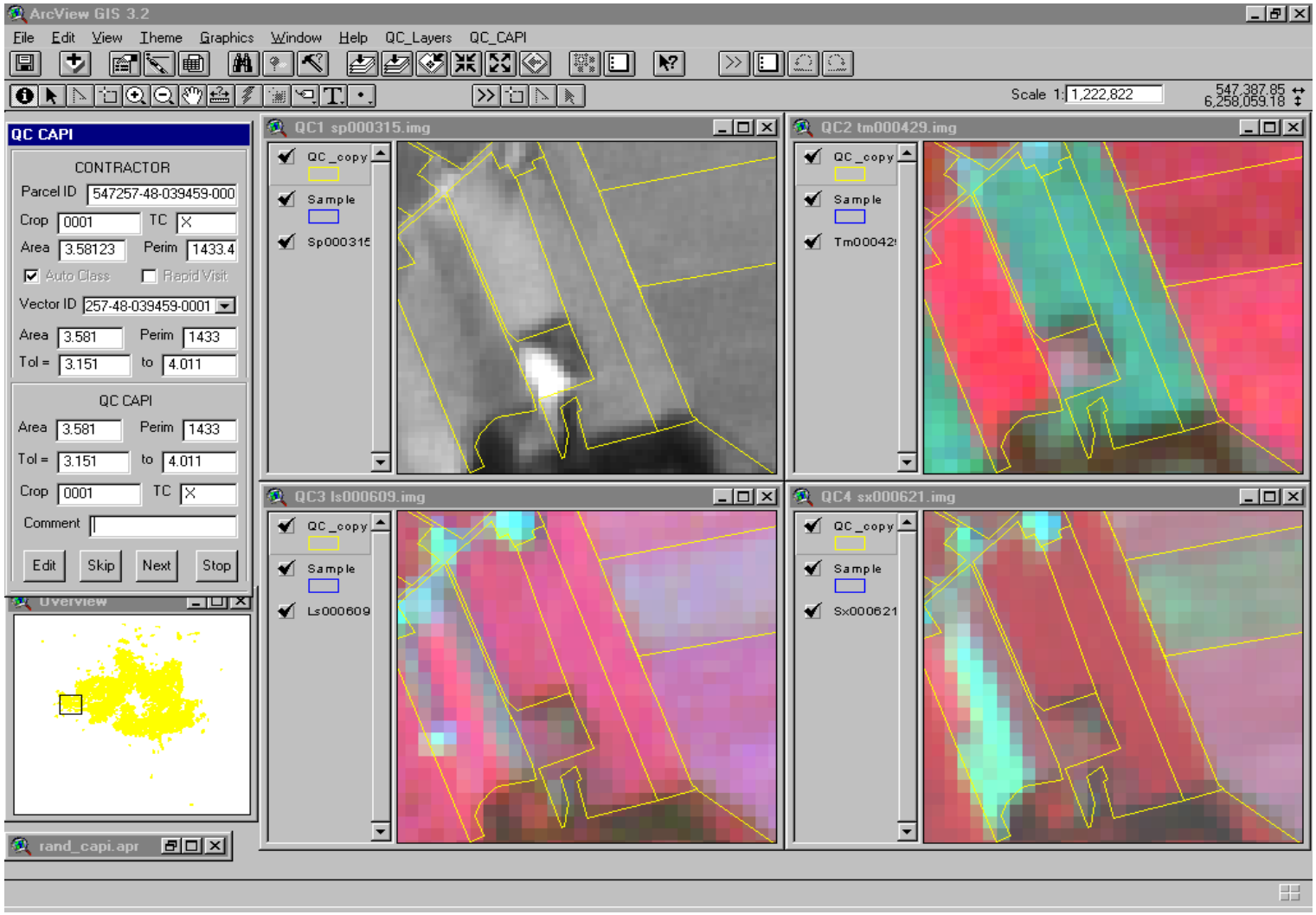
Space Applications Institute

CHANGES IN QC METHODOLOGY
CAPI software

- **Main functionality**
  - ⇨ Automatic creation of a working editable layer
  - ⇨ Automatic calculation of vector area, perimeter and tolerance
  - ⇨ Automatic link between the alphanumeric data and the vectors
  - ⇨ Multiple linked windows zoom / pan automatically to corresponding vectors
  - ⇨ Interactive on-screen editing of boundaries, automatic update of vector area and perimeter
  - ⇨ Automatic identification of overlaps, calculation of percent overlap
- **Added in 2000**
  - ⇨ Process parcels sequentially, or by specific crop type or problem code
  - ⇨ Interactive editing of boundaries of other parcels
  - ⇨ Automatic identification of multiple claimed parcels

Space Applications Institute

CAPI interface



Space Applications Institute

QC CHECKS – WORK PROGRESS

- National Administrations nominated one QC site per contractor (total of 19 sites)
- JRC selected a subset of 6 sites for full QC checks (external QC by HTS)
- JRC to carry out first-stage checks on most of the remaining sites (i.e. Conformity checks, HTS not involved)

Contractor	Data Delivered	Database Checks	Image Checks	CAPI Checks	Site Report
DIAS	Yes	Complete	Complete	Complete	Complete
SCOT	Yes	Complete	In progress	Complete	In progress
GAF	Yes	In progress		Complete	
Elliniki	Yes				
Anon 1	No				
Anon 2	No				

Space Applications Institute

CONCLUSIONS

- Based on results from first 3 QC sites
- High level of conformity with recommended formats
  - ⇨ Good collaboration between JRC and contractors, problems solved before data delivery
  - ⇨ Straightforward input of received data
- Consistency checks of alphanumeric data
  - ⇨ High level of consistency between the different tables
- Conformity checks of diagnostic results
  - ⇨ Almost 100% agreement with the contractor's results
- CAPI checks of contractor's interpretation
  - ⇨ Very good agreement between vectors and imagery
  - ⇨ Small number of problems with land use interpretation (i.e. absence of late image for summer crops)
  - ⇨ Some inconsistencies in application of problem codes
- Image quality checks
  - ⇨ Some particularly good aerial photography

Space Applications Institute

Acquisition and Delivery of Satellite Data in 2000 Campaign

Guido Peroni

European Commission, DG-Joint Research Centre
Space Applications Institute
Agriculture and Regional Information Systems
MARS - Control with Remote Sensing
http://mars.aris.sai.jrc.it/control/

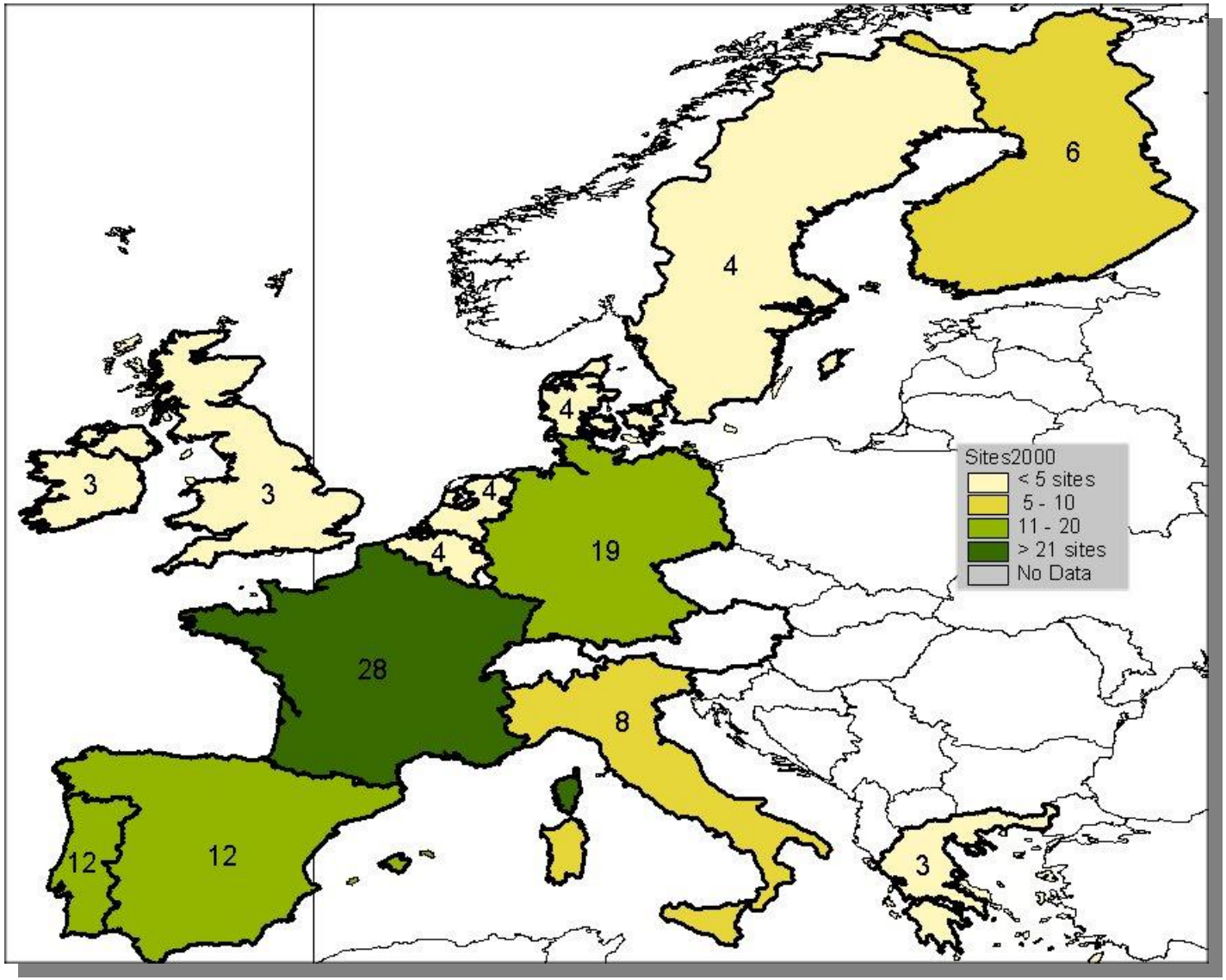
6th. Conference on Control with Remote Sensing of Area-based Subsidies

Dublin, 16-17 November 2000

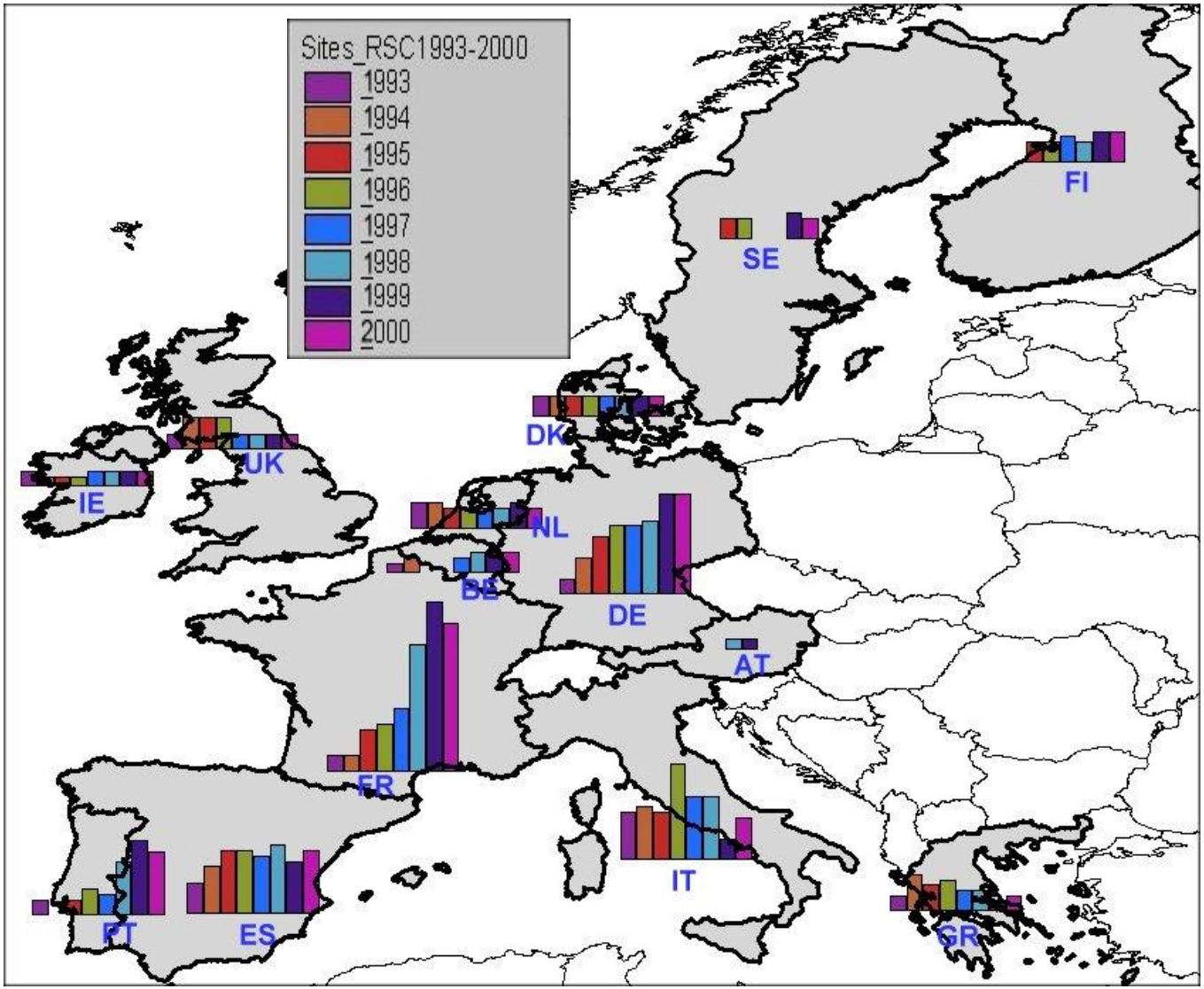
General Statistics
(satellite data for RSC, campaign 1999/2000)

- **Imagery Budgets (DG-Agri)**
  - ⇨ **1,100,000 EURO (1st. Engagement), related to old FCs**
  - ⇨ **895,000 EURO (2nd. Engagement), related to new FCs**
- **MS participants** — **13**
- **Contractors involved** — **18**
- **Sites (satellite)** — **110**
- **Area covered by Sat. imagery** — **> 275,000 Km^2**
- **Total images distributed to MS** — **758 (1,786,983 Euro)**

Satellite Sites Distribution for RSC2000

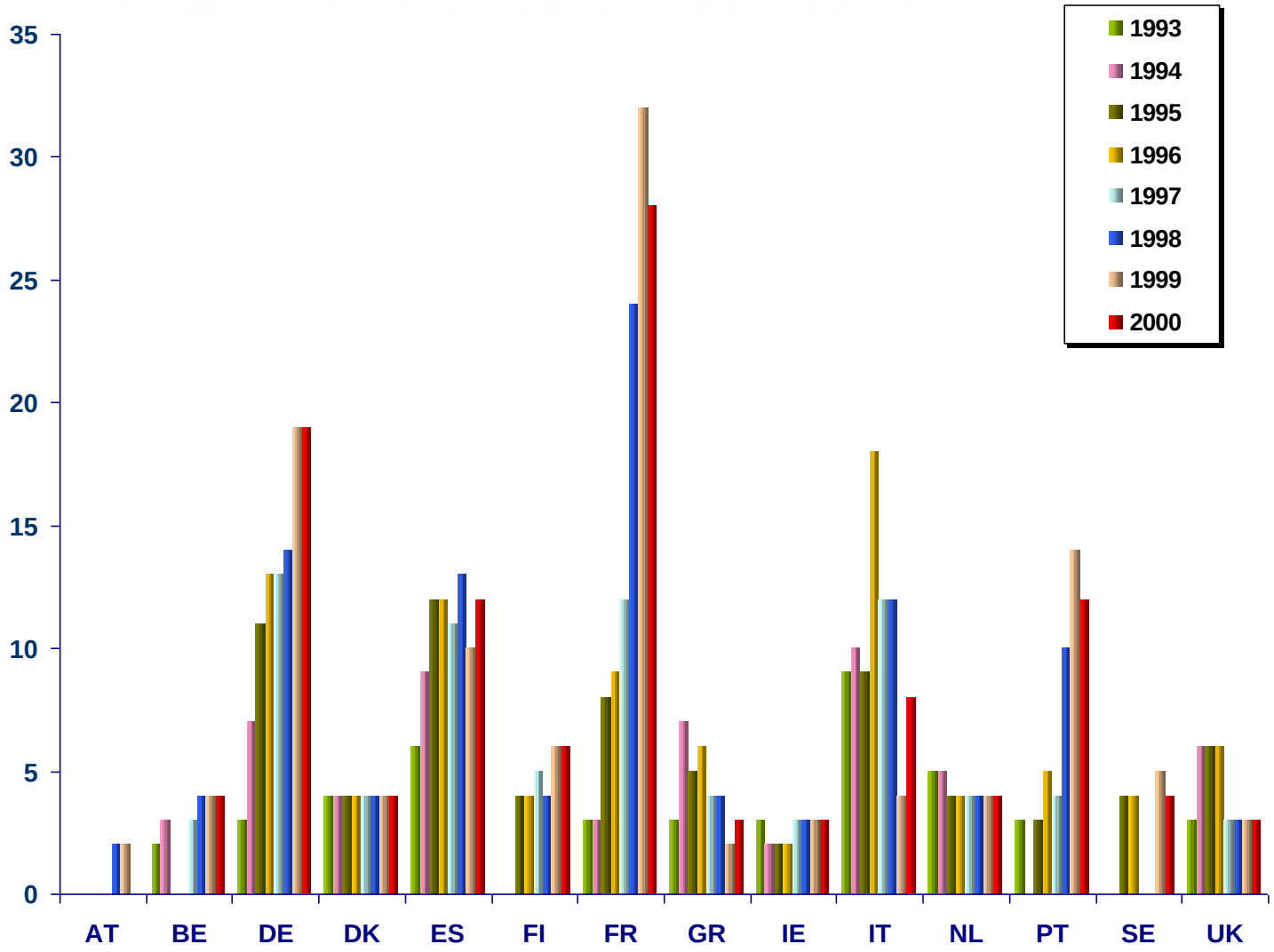


Number of Satellite Sites in different MS: trend 1993-2000



Controls with Remote Sensing

Number Satellite Sites in EU:
MS direct comparison 1993-2000

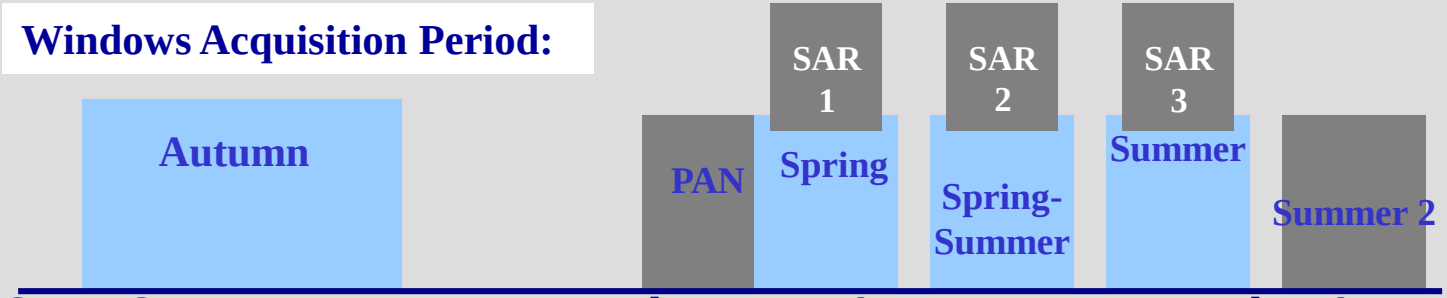


Controls with Remote Sensing

Satellite Imagery for RSC: suitable periods for acquisition windows and archive data

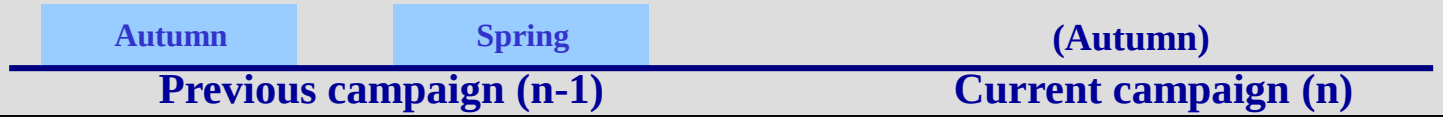
Controls with Remote Sensing

Windows Acquisition Period:



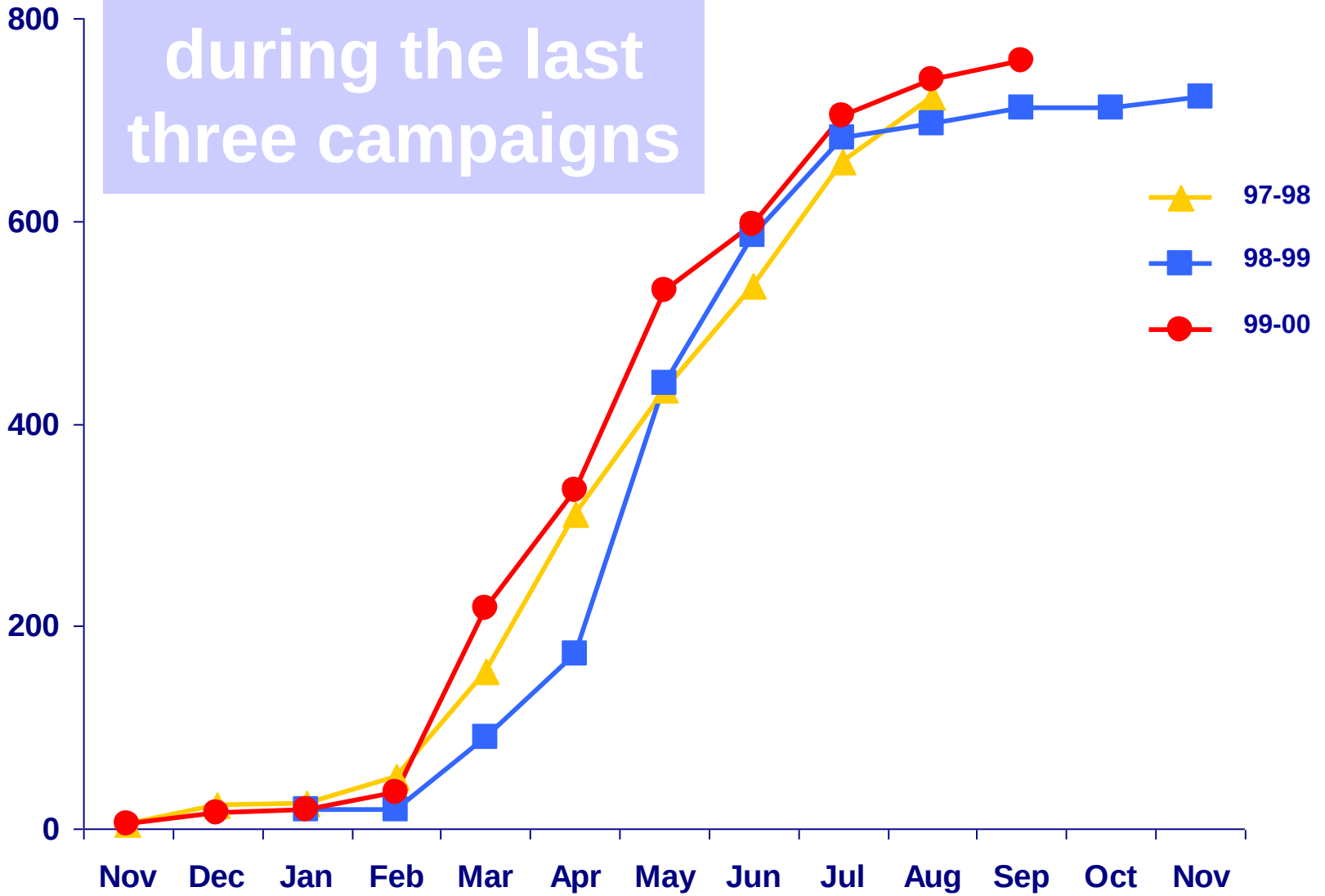
Reference Period:

Eligibility Period (for set-aside) :

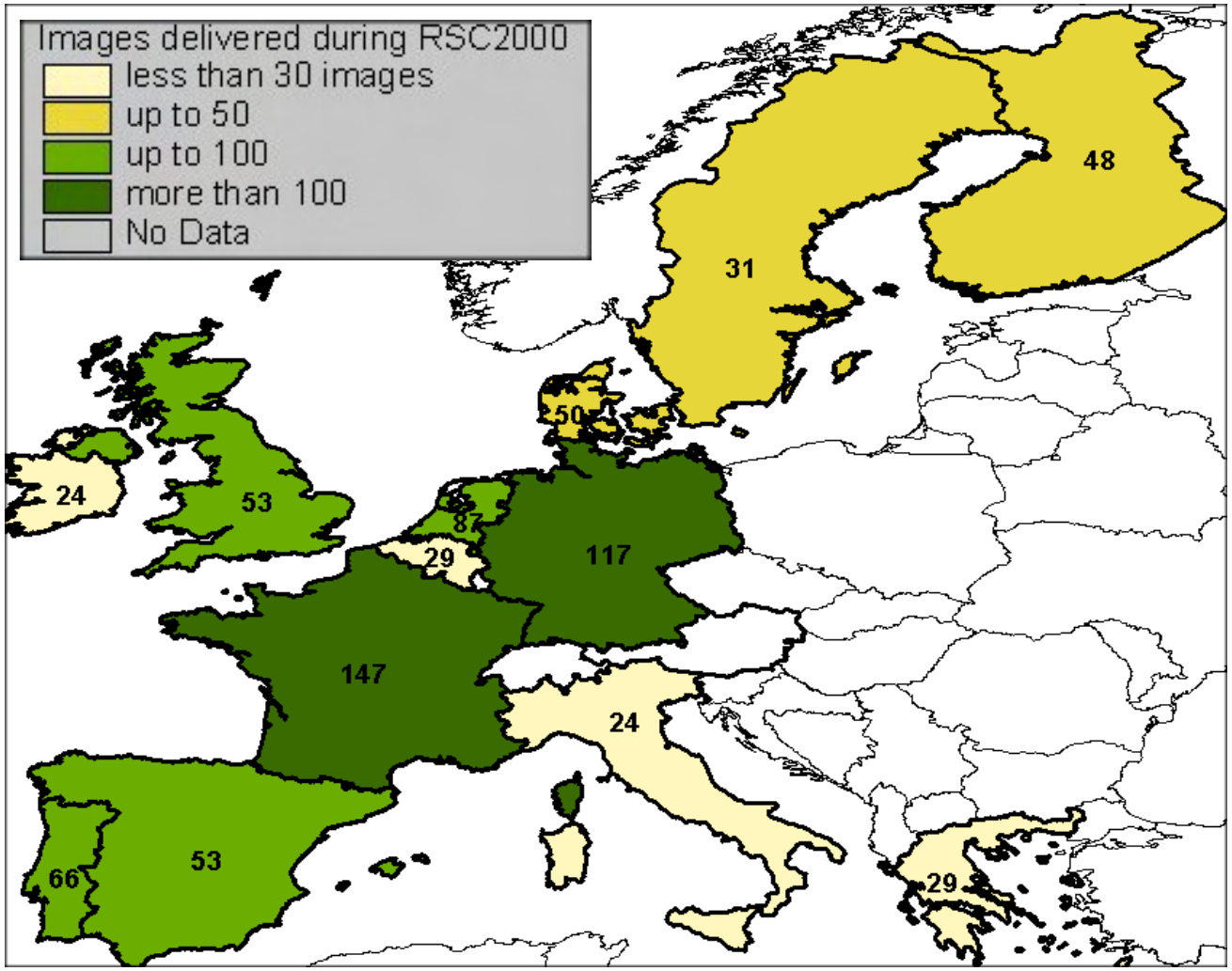


Space Applications Institute

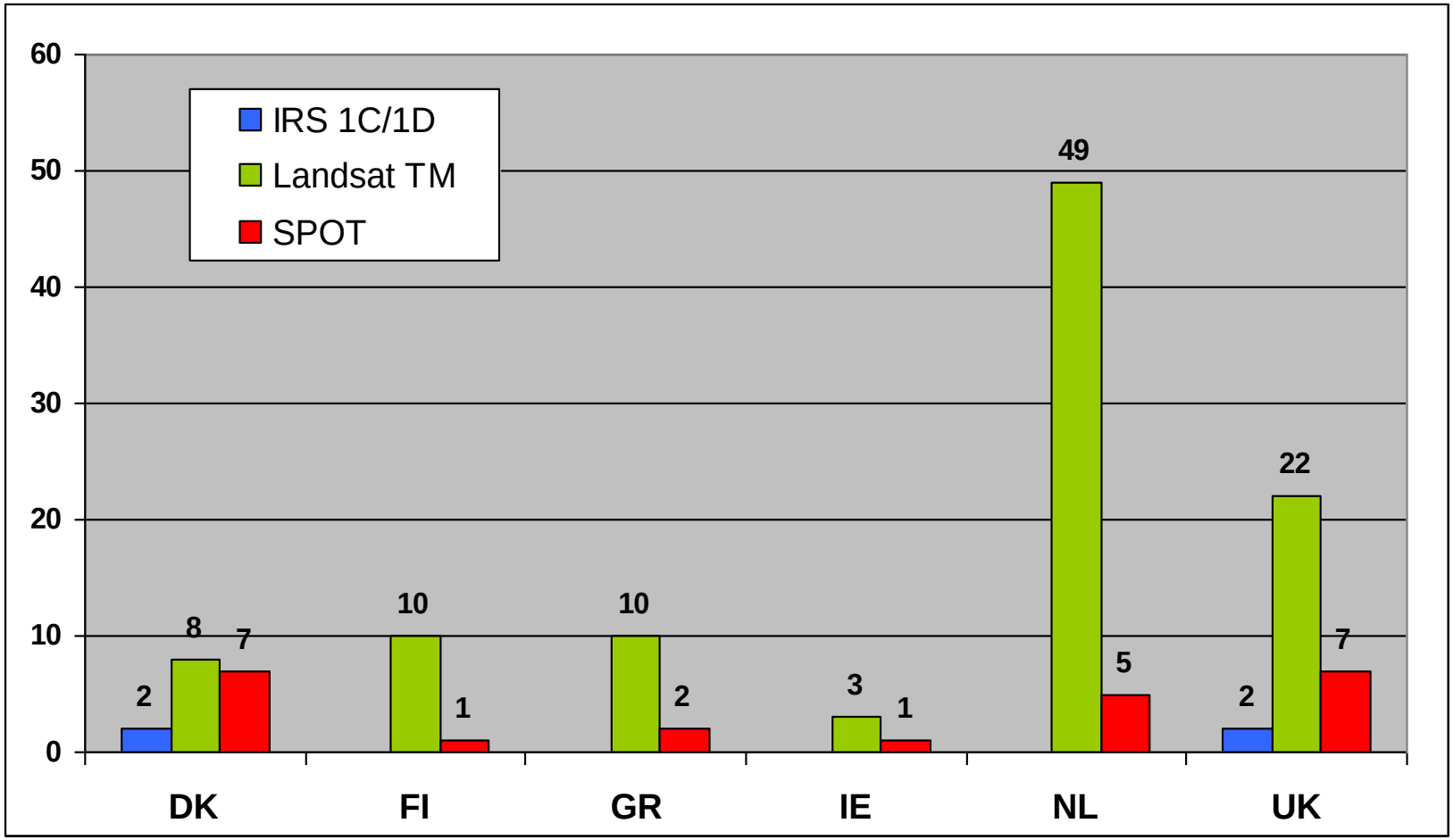
Images ordered and distributed during the last three campaigns



Total number of Satellite images distributed in EU during RSC2000



Archive optical imagery ordered for RSC2000



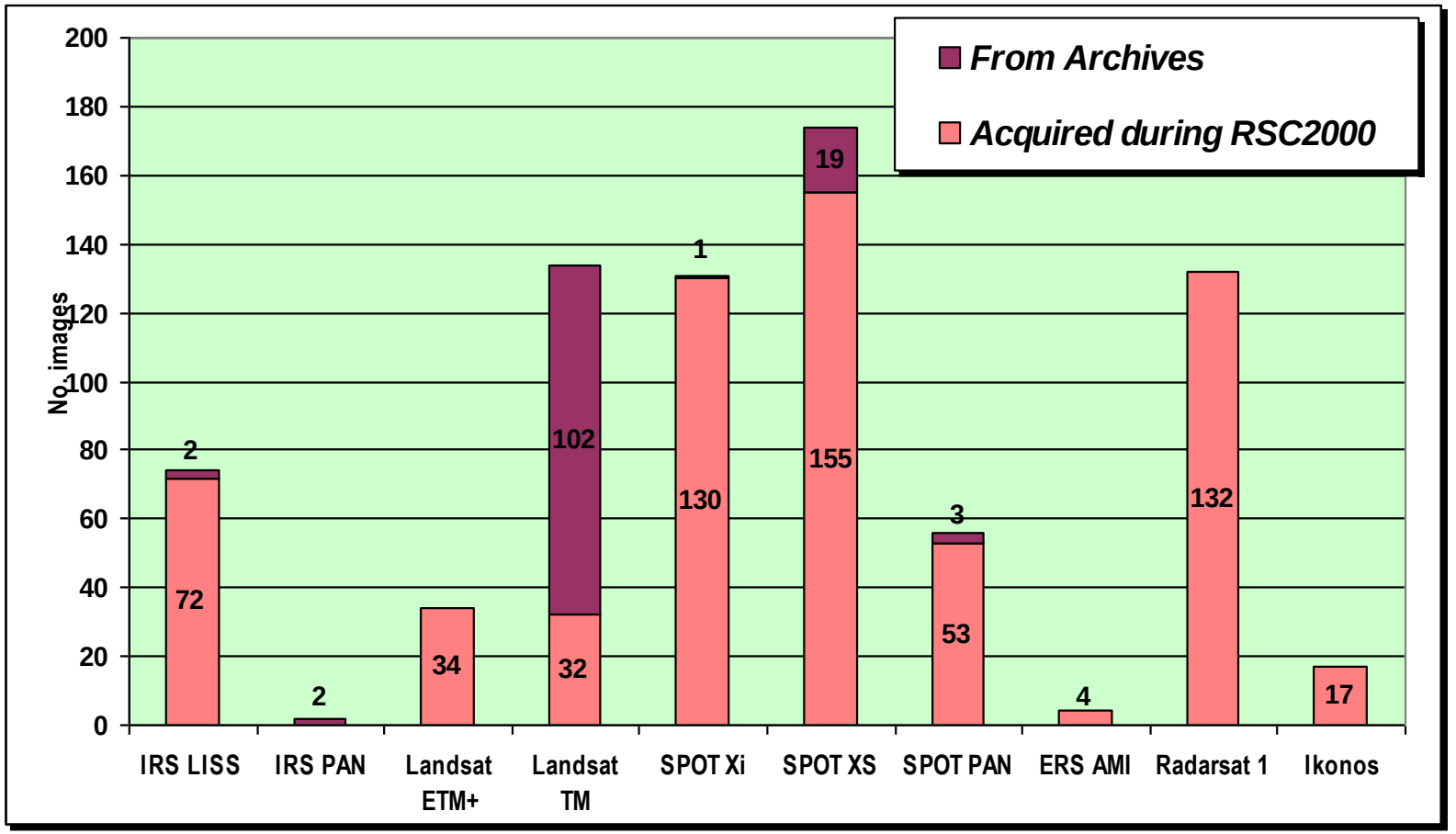
Controls with Remote Sensing

Imagery Statistics:

satellite data distributed during RSC2000

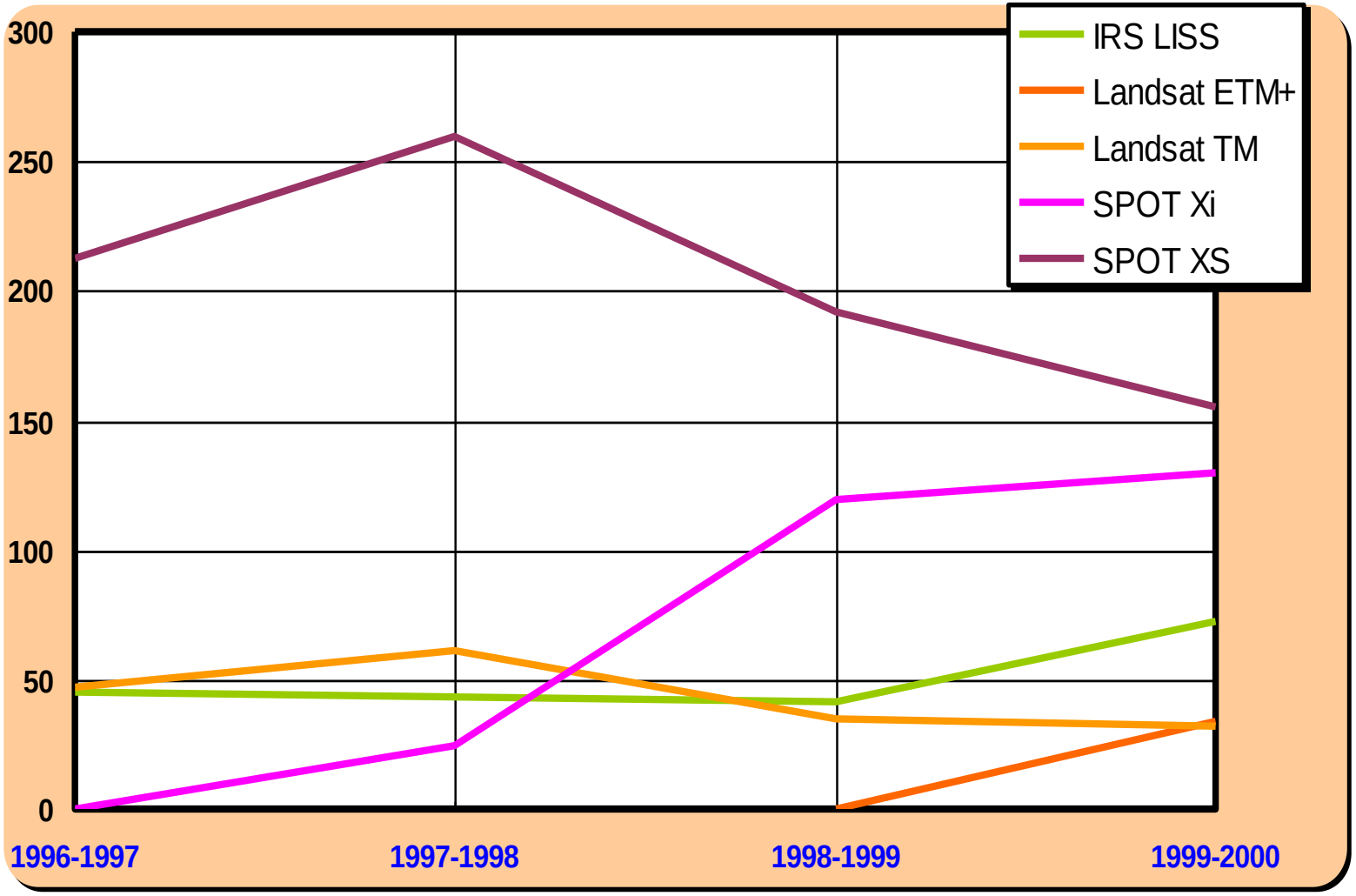
		(RSC1999)
Multispectral 1999/2000	423(*) +	(387)
(*) totally required: 430. Rate of success: 98%, (previous campaign: 96%)		
Pan 2000	53(**) =	(63)
(**) totally required: 53. Rate of success: 100%, (previous campaign: 100%)		
•Optical acquired 1999/2000	476 +	(450)
• Optical from archives	129 +	(156)
• Ikonos Test	17 =	(n/a)
Total Optical	622 (82%) +	(606, 84%)
Total SAR	136 (18%) =	(116, 16%)
Total images delivered	**758**	**(722)**

Type of Satellite data ordered for RSC2000

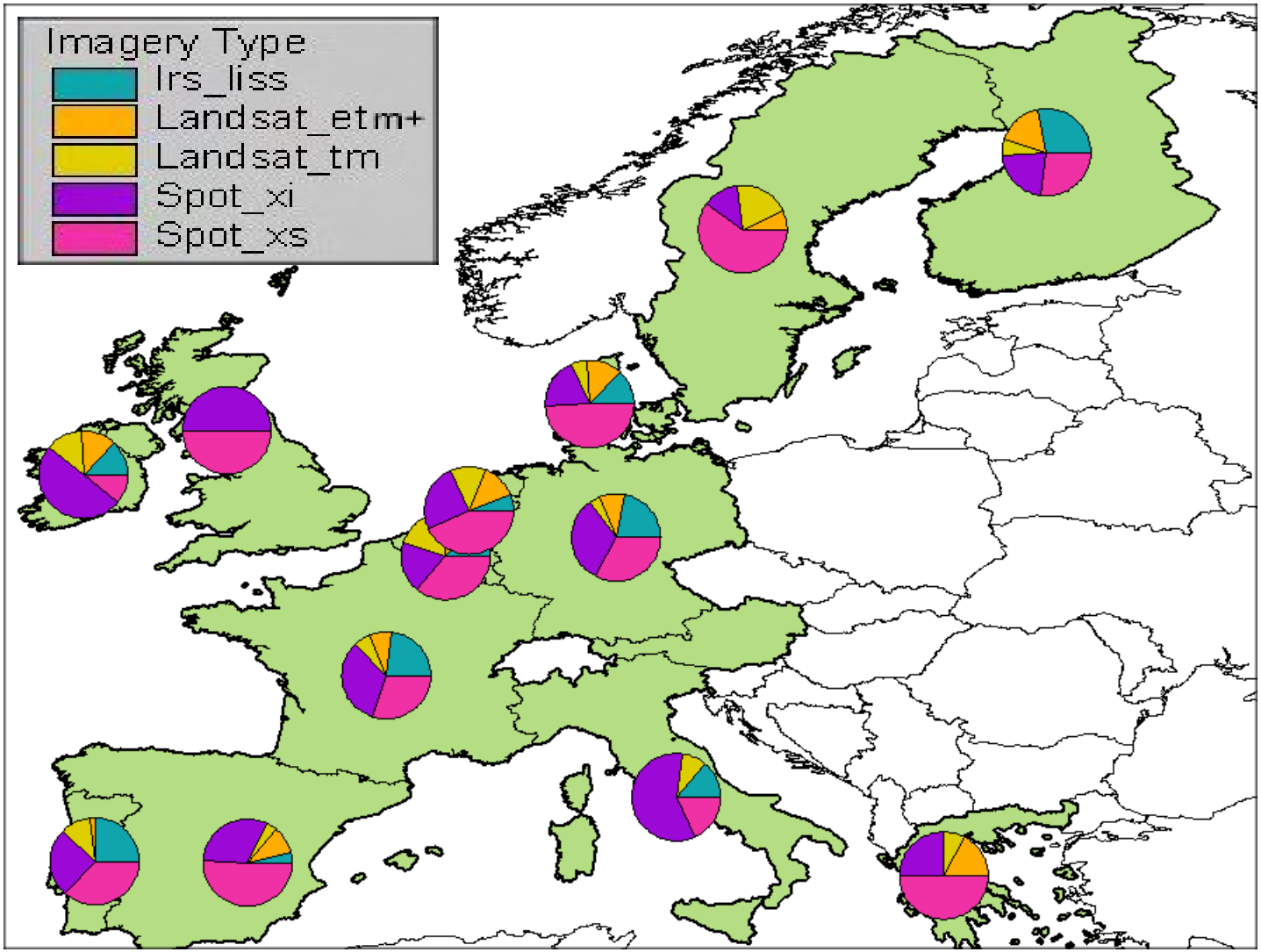


Controls with Remote Sensing

Optical data acquired during campaign: trend 1997-2000

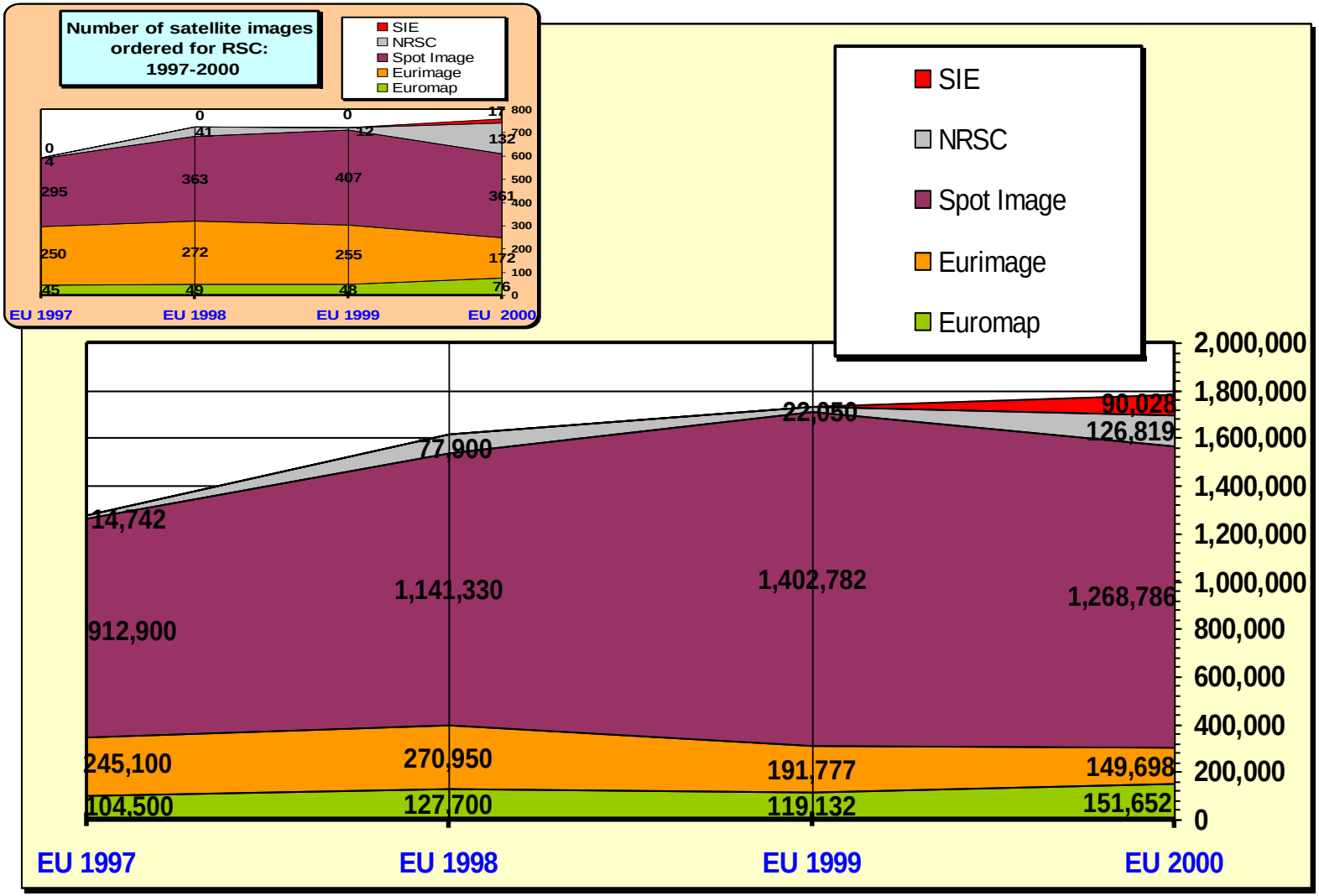


Optical data acquired during campaign over different MS



Controls with Remote Sensing

Satellite Imagery ordered for RSC2000: trend costs 1997-2000



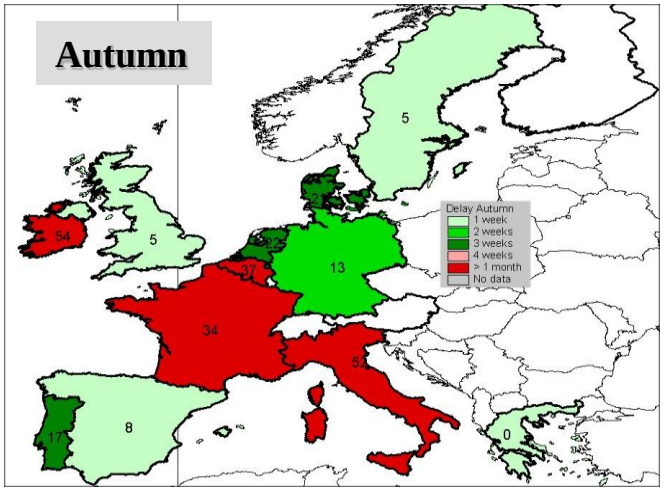
Number of days required for collecting (optical) imagery during RSC2000

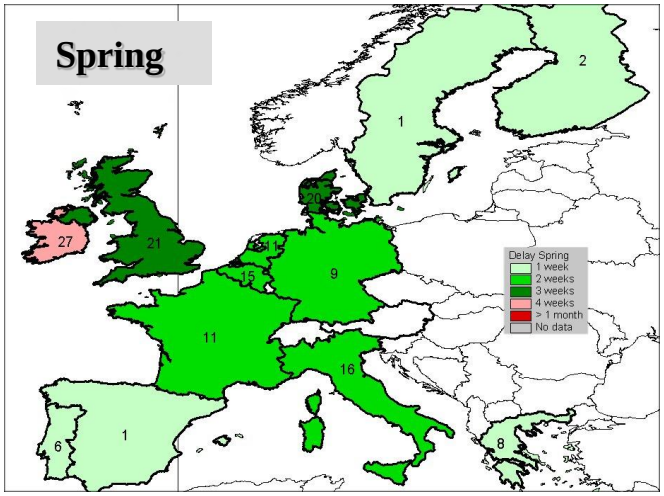
MS	Avg delay for **Autumn** image	*RSC 1999*	Avg delay for **PAN** image	*RSC 1999*	Avg delay for **Spring** image	*RSC 1999*	Avg delay for **Spring-Summer** image	*RSC 1999*	Avg delay for **Summer** image	*RSC 1999*	Avg delay in **RSC2000**	*RSC 1999*
BE	**37**				**15**	*17*	**31**	*25*	**17**		25	***21***
DE	**13**		**11**	*9*	**9**	*18*	**3**	*17*	**-8**	*8*	9	***13***
DK	**21**	*-39*	**9**	*6*	**20**	*11*	**15**	*3*	**2**	*24*	13	***11***
ES	**8**	*11*		*-8*	**1**	*5*	**10**	*12*	**2**	*2*	5	***7***
FI					**2**	*8*	**11**	*9*	**14**	*13*	9	***10***
FR	**34**	*35*	**18**	*22*	**11**	*15*	**15**	*14*	**9**	*7*	17	***18***
GR	**0**	*12*	**7**	*17*	**8**	*4*	**1**	*10*	**3**	*4*	4	***9***
IE	**54**	*-125*	**33**	*-70*	**27**	*66*	**32**				37	***66***
IT	**52**	*51*			**16**	*3*		*18*	**4**	*11*	24	***21***
NL	**22**	*-82*	**13**	*12*	**11**	*1*	**5**	*8*	**24**	*11*	15	***8***
PT	**17**	*13*			**6**	*15*	**13**	*1*	**0**	*1*	9	***7***
SE	**5**	*-116*	**10**	*16*	**1**	*4*	**8**	*20*	**17**	*11*	8	***13***
UK	**5**	*-92*	**12**	*16*	**21**	*13*	**5**	*29*	**8**	*2*	10	***15***
Global Avg	**22**	***24***	**14**	***14***	**11**	***14***	**12**	***14***	**9**	***8***	**14**	***17***

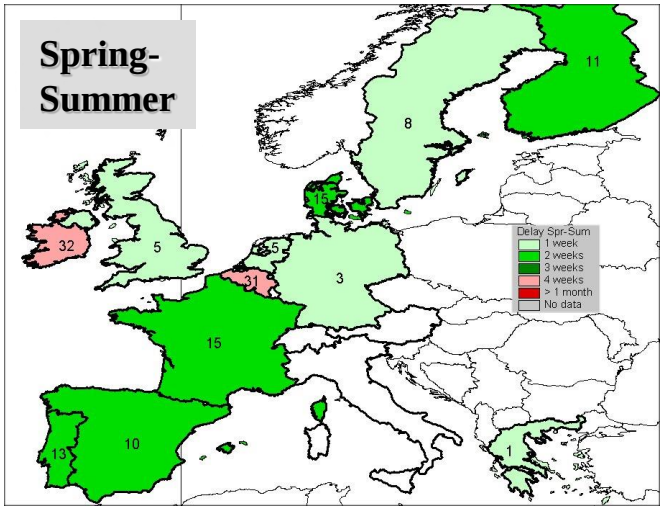
Time required to collect (optical) imagery in different MS: visual comparison of principal windows

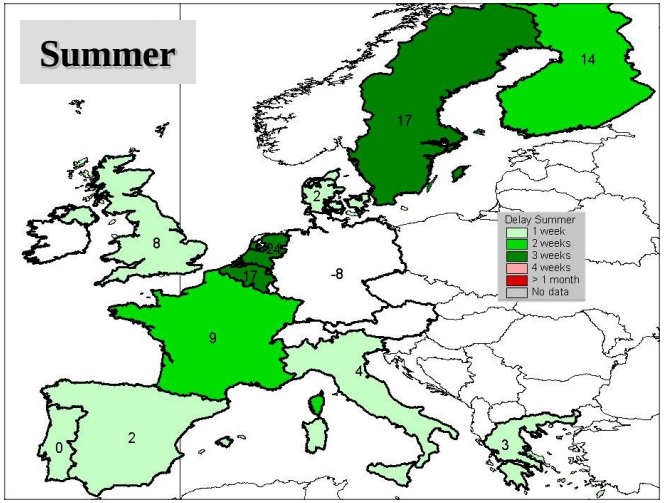
Space Applications Institute

Controls with Remote Sensing









Scenes not acquired:

- Autumn: **1** (IE)
- Spring: **1** (FR)
- Spr-Sum: **1** (UK)
- Summer: **4** (DE, SE, UK)

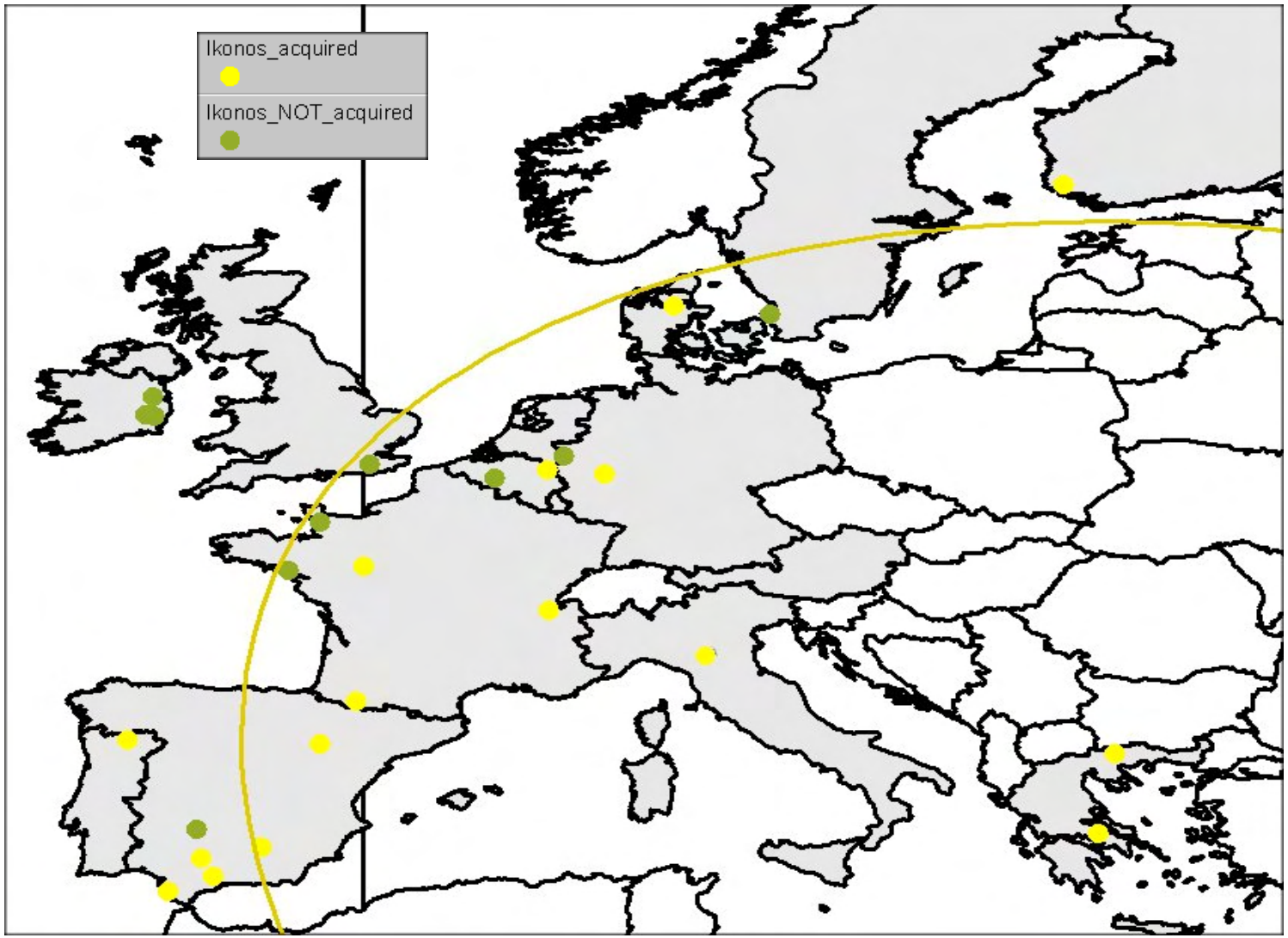
Principal problems encountered during campaign

- The conclusion of 5-year Framework Contracts for satellite data procurements and the procedure for their renewal (in progress at the start of the campaign), determined the need to divide the 2000 imagery budget in two different parts:
  - ⇨ the first budget, still referring to "old" FCs (expiring between April/June 2000). Available in March 2000. Advanced orders (April and May) to prevent possible interruption in data ordering and delivery.
  - ⇨ the second budget, referring to new FCs. Available in July 2000 for covering the conclusion of 2000 Campaign (Ikonos Test included).
- Data rejected by Provider (internal QC during production) after order placed (window closed) (twelve cases; affected: BE, DE, DK, FR, IE, NL).
- Radiometric problems severely affecting the image (six cases; affected: DE, ES, IE).
- Data sent to wrong addresses (four cases, affected: ES, FR, GR, NL, SE, and JRC).
- Data apparently not conforming to standard format (three cases in NL).
- Plastic cases arrived damaged to contractor premises (six cases: FI and UK).

Ikonos Test during RSC2000

- SIE Contract's signature: 23 May 2000
- Acquisition period: 12 May-15 October 2000 (each site with own specific window)
- 16 AOIs acquired (2 Full, 1multi-temp, 13 Mini sites)
- Acquired by on-board recorder (AOI located outside Athens Cone): ES(DAP), FI, PT
- Total surface collected: 5,120 Km^2
- No. days for acquiring the requested AOI:
  - ⇨ Avg.: 26 days
  - ⇨ Min : 8 days (ES, GR)
  - ⇨ Max : 117 days (DK)

Ikonos Test Sites during RSC2000



Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

6th Conference on CwRS
Dublin, 16 & 17 November 2000

New Issues in the 2001 Campaign

Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

Introduction

- Changes to the Common Technical Specifications
- Results of a discussion with image providers
- Proposal for workflow automation
- Other organisational matters

Space Applications Institute
JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

Control with Remote Sensing

The 2001 Common Specs

- Participants FI, FR, D, GR, IE, NL, PT, SE, UK (pre-publication in OJ on 12.10.2000)
- Changes in 2001 are relatively minor
- Mainly related to new tolerance criterion
- Changes to schemes
- Some related to use of IKONOS, other image use
- Further clarification of textual matters
- Review of legal position Commission
- Published together with “change” table
  - OJ publication expected around 25 November

Space Applications Institute
JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

The tolerance criterion

- Laid down in "Recommendations for on-the-spot measurements of area"
- DG AGRI document VI/8388/94 version 6 of 17.12.1999
- "the method of measurement must be adapted to the parcel size in the region concerned, so that the objective of a 5% tolerance is met for half the areas checked"
- In practice: buffer width < 3 m, 1 m
- Maximum allowed tolerance area 1 ha
- All area measurements in 2 decimals

Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

Changes to schemes

- Related to Council Reg. 1251/1999
- No longer "general" and "simplified" schemes
- Set aside obligation defined by "large producer" and "small producer" categories (92 ton cereal production)
- Some MS will use new categorisation

Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

Changes related to imagery

- Introduction of IKONOS on a provisional basis, but to be used operational (starting in March)
- Use of PAN and 3-channel PSM
- SPOT/IRS PAN data only on request (viz. tolerance parameters)
- Spring/summer series default 3 images
- Introduction of (E)TM subscription service (experimental)
- Actual ortho-image could replace satellite optical

Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

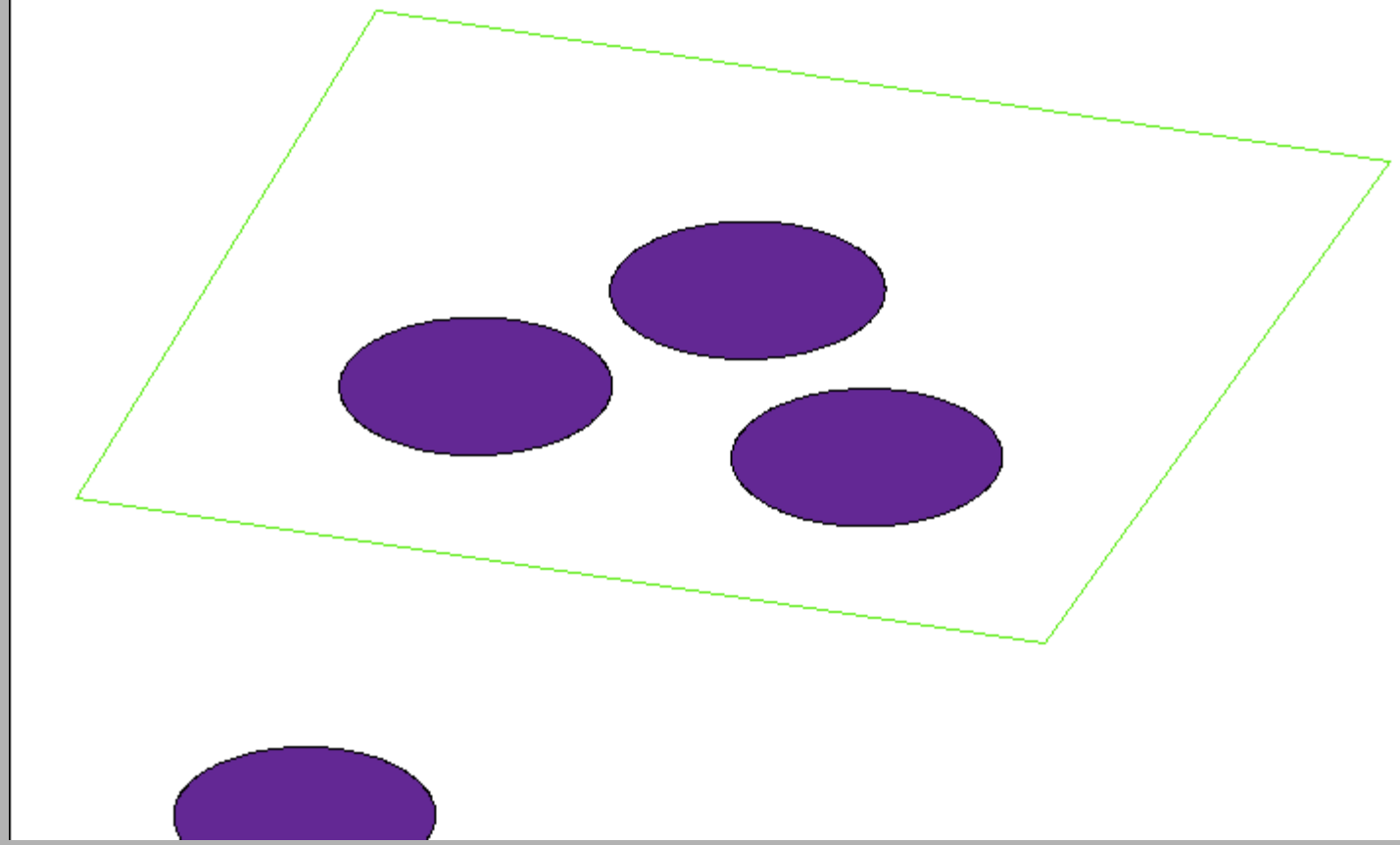
Discussion with image suppliers

- Following changes in 1999
- Availability, price, VHR, RADARSAT, member state choice
- Focus on achieving savings to prepare for VHR inclusion, CEEC in future
- Presented 4 scenarios for review
- 1. “Urgent period” programming only
- 2. Subscription fixed track sensors
- 3. “Split window” programming
- 4. Fixed budget per contractor

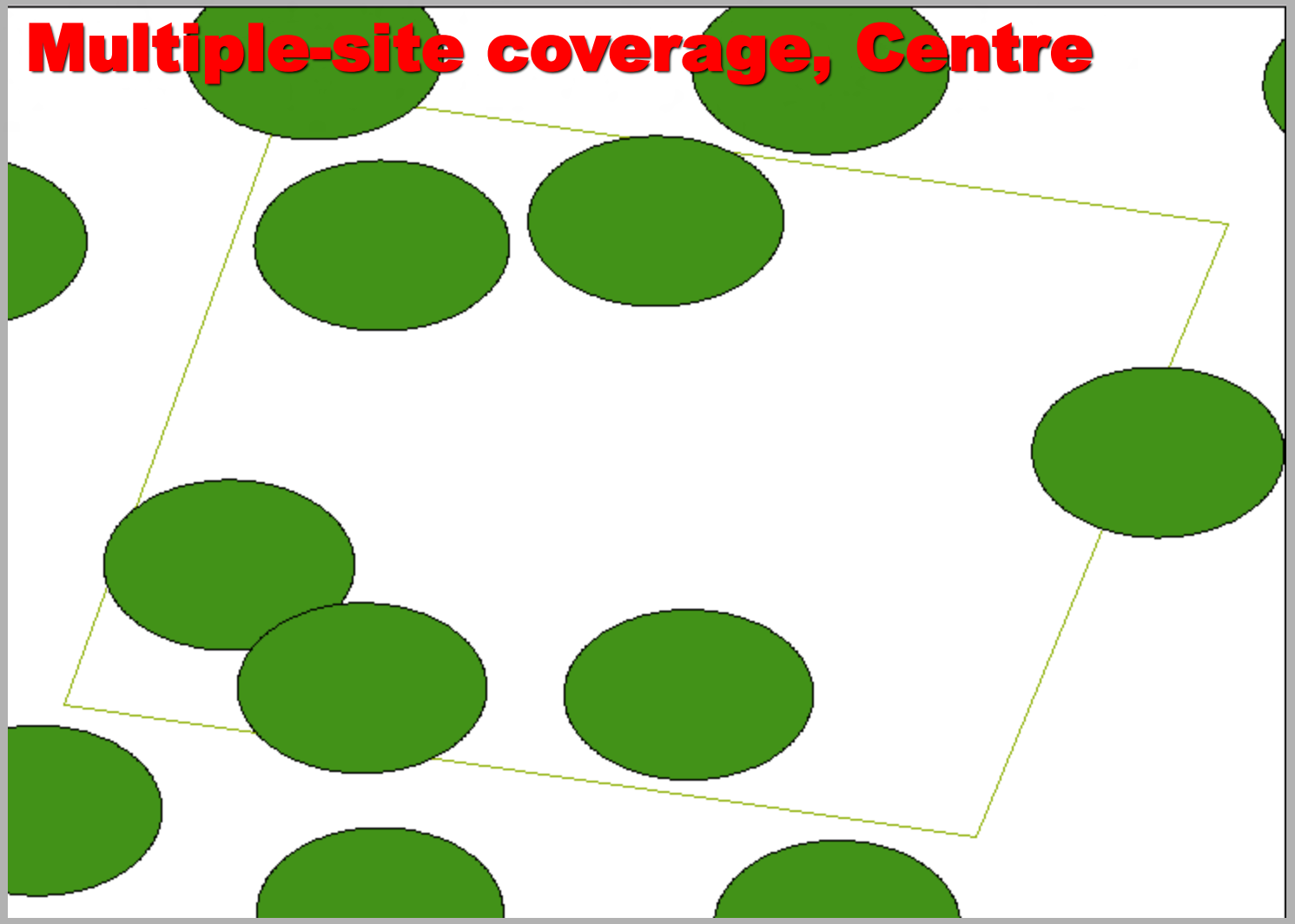
A subscription service

- **Under review**: a 12 image series of Full frame ETM/TM (6000 Euro)
- Including cloud cover analysis and rush service
- **Main points**: site coverage, success rate
- **Analysis**: 2001 site/frame location, cloud cover

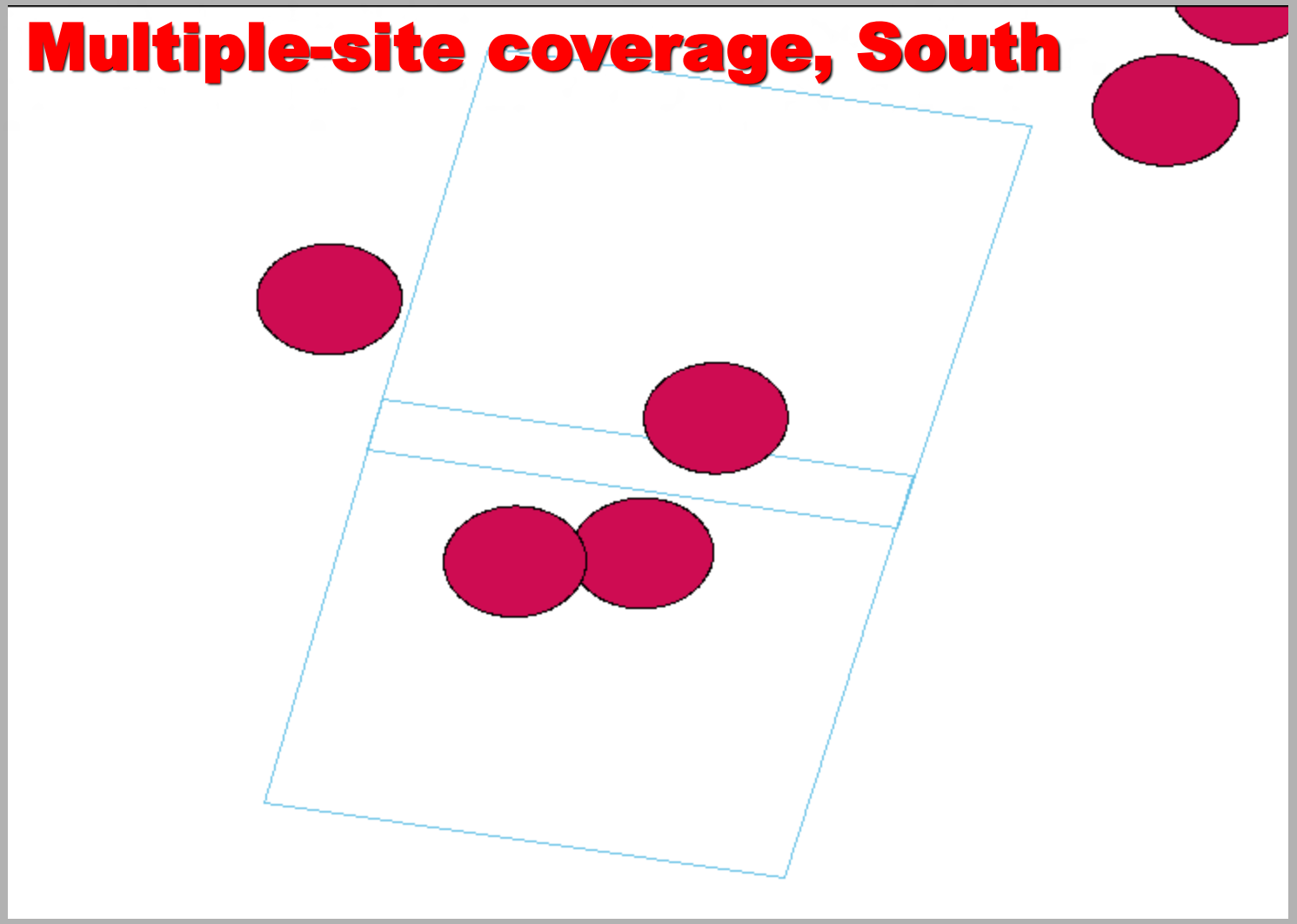
Multiple-site coverage, North



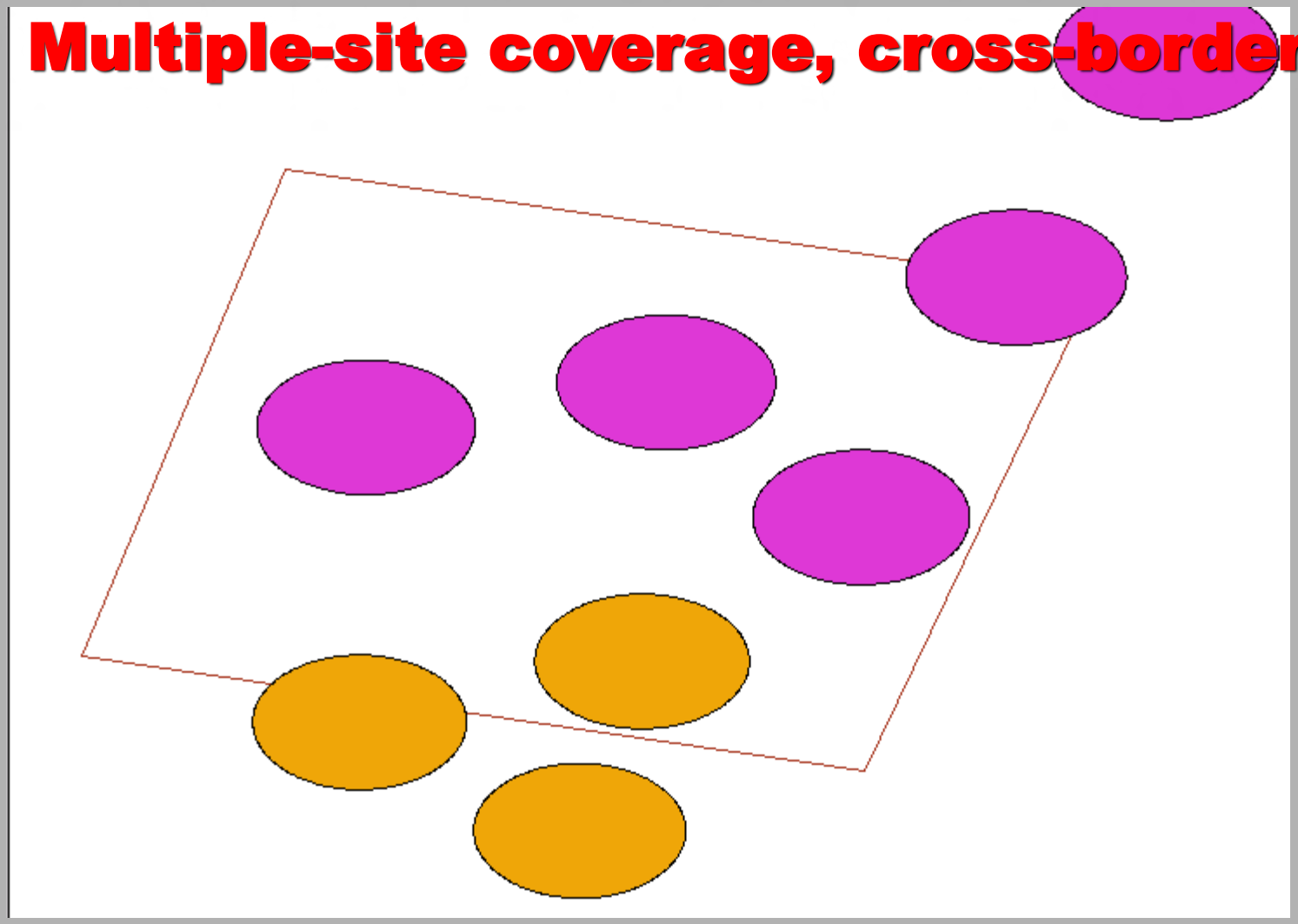
Multiple-site coverage, Centre



Multiple-site coverage, South



Multiple-site coverage, cross-border

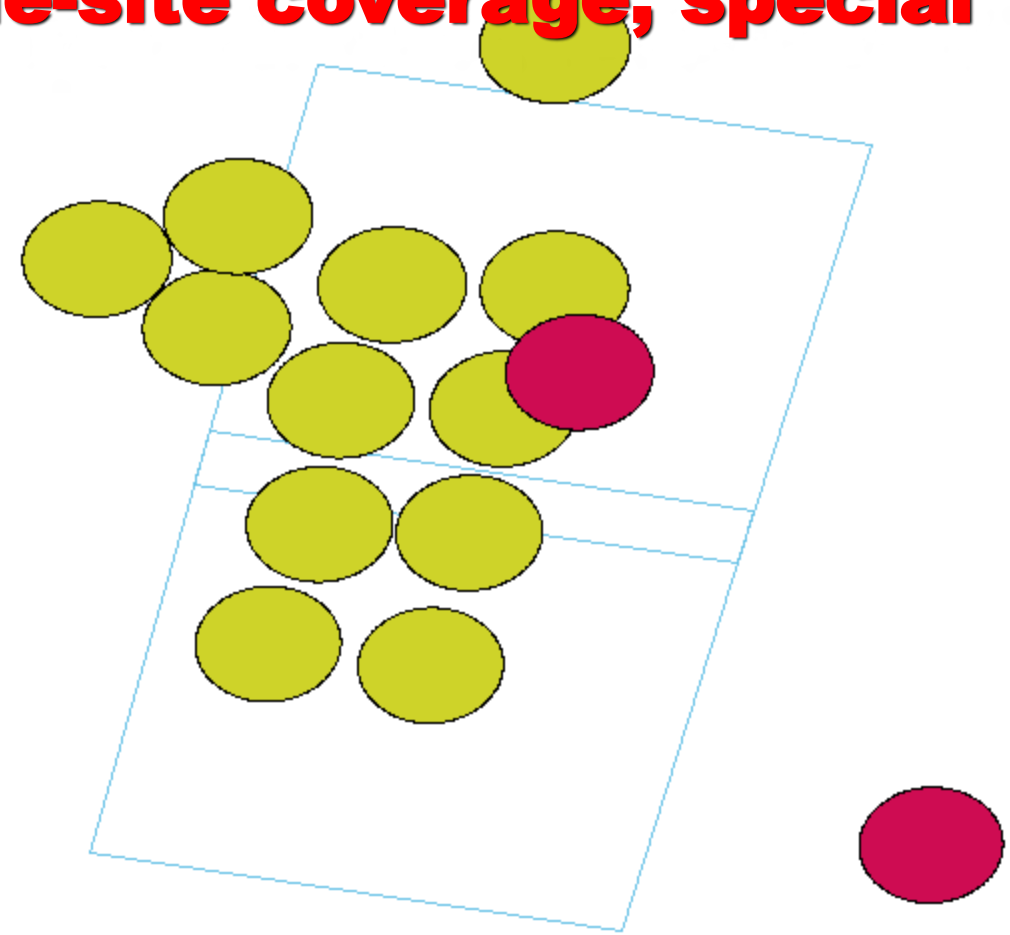


Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

Control with Remote Sensing

Multiple-site coverage, special

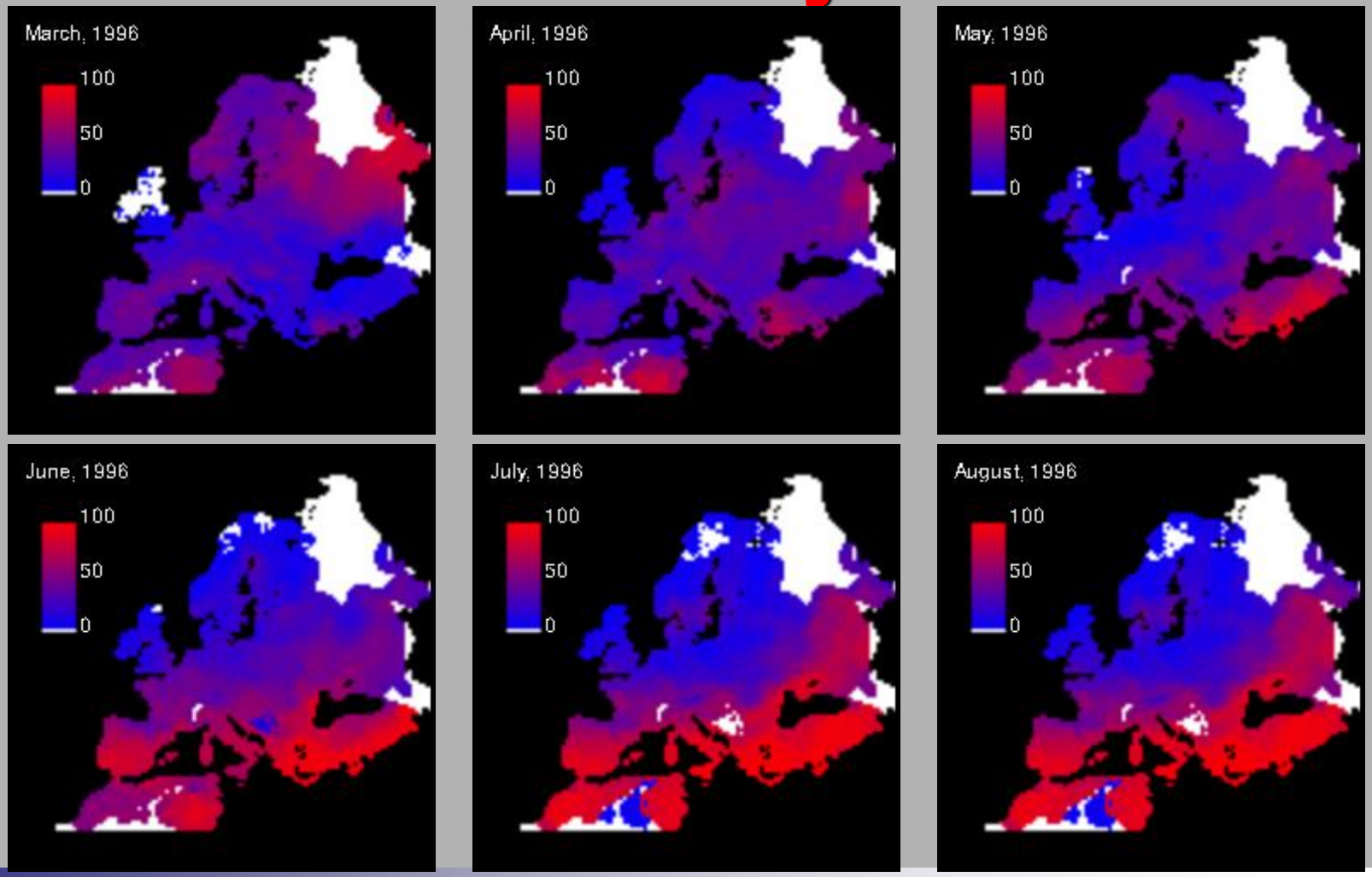


Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

Control with Remote Sensing

MARS Cloud cover analysis



Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

Preliminary conclusions image supply

- Reliability of data supply prime criterion
- Testing of alternatives on a trial basis
- Voluntary participation of the contractor, accommodate preferences
- VHR supply not expected to grow fast
- What will happen in "the market"?
- Continuation of discussion, with involvement of Admin, contractors
- Please let us know your opinions

Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

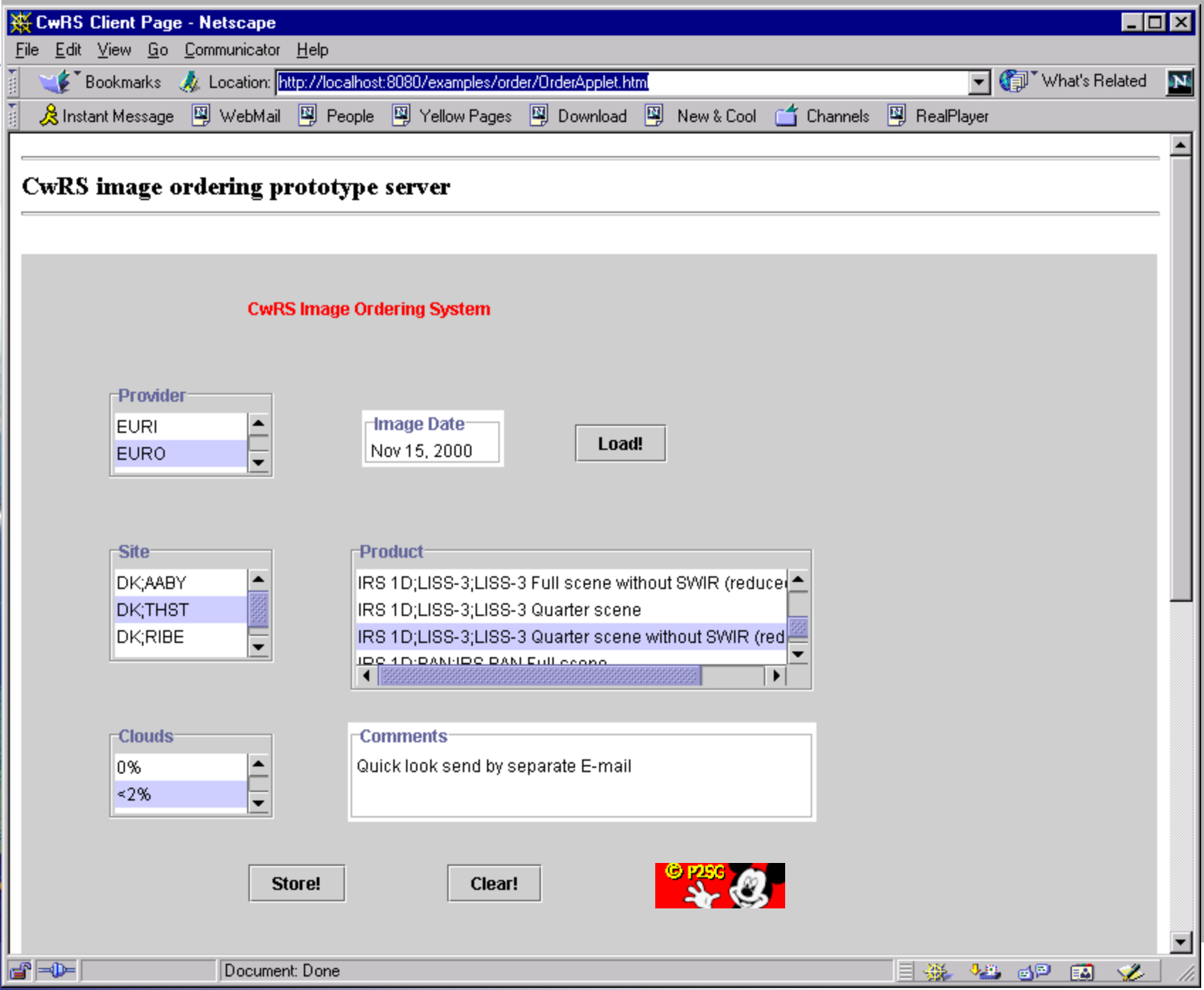
Proposal for workflow automation

- Image ordering procedure is highly interactive
- Includes notification of acquisition, check of quick look, confirmation of order, conflict resolving, invoicing, etc.
- Involves image providers, JRC Control, contractors and DG AGRI
- Would benefit from accessible, but secure tracking system
- Based on structured data base
- Web access + JavaMail

Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

Control with Remote Sensing

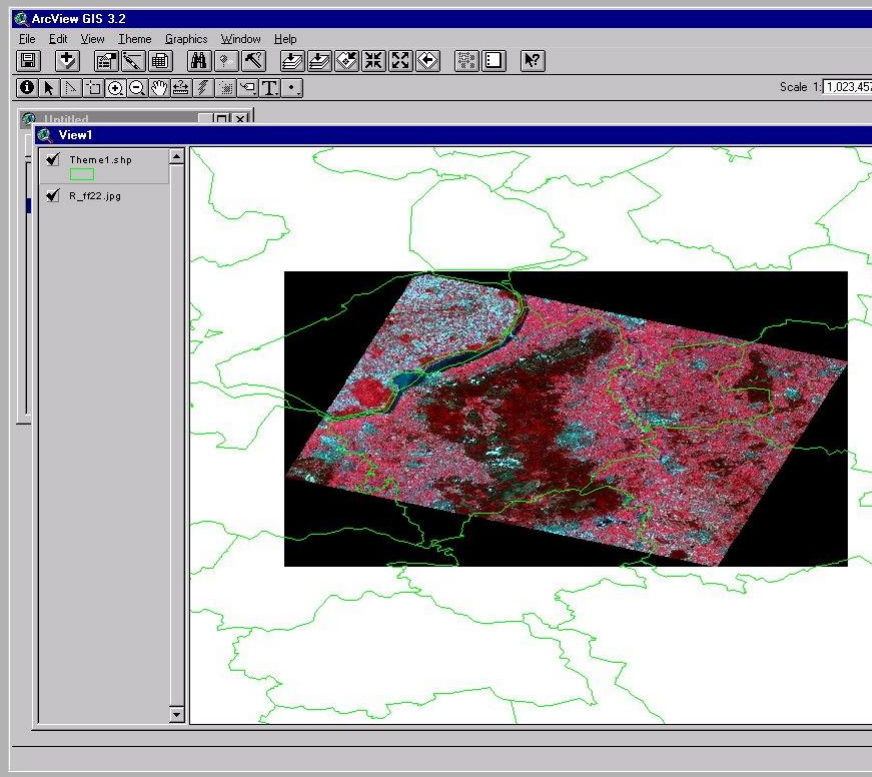


Order data base development

- Java QL warper
- to be integrated
- standard format?

- JavaMail tested

- Complete solution
- Java client-server



Other organisational matters

- Use of E-mail is very much appreciated!
- 98.3% of the participant directly reachable by E-mail!
- Some use hybrid E-mail/fax

- Deadlines are essential!
- Delays always have a knock-on effect
- In 2001 we want to stick to pre-determined schedules strictly
- That is, both ways... ☺

Space Applications Institute

6th conference

Controls with Remote Sensing of Area Based Subsidies

Dublin , 16- 17 November 2000

Review of 2000's Campaign

Methodologies, improvements and questions

Olivier LEO

MARS

Space Applications Institute

MARS Projet

…but a summary review

- late delivery of reports
  - and earlier date of conference !
- Change with previous years
  - Schedule , Technical tolerances and rejection rates
- More qualitative than quantitative
  - MS diversify methodologies
  - illustrate trends with "sketch maps"
- A review of Technical tolerances
- identify topics of interest

Space Applications Institute

Review of 2000's Campaign

- Improvements in the methodologies
- Technical Tolerances
  - *Strengthening the values*
  - *Introducing a ceiling of 1 ha*
  - *Reaching the 5% Accuracy Target?*
  - *Strategy of control ?*
- Controls of durum Wheat?
- Controls of Reference Year ?

Space Applications Institute

MARS Projet

Review of 2000's Campaign

- Improvements in the methodologies

- Technical Tolerances
  - *Strengthening the values*
  - *Introducing a ceiling of 1 ha*
  - *Reaching the 5% Accuracy Target?*
  - *Strategy of control ?*

- Controls of durum Wheat?
- Controls of Reference Year ?

Space Applications Institute

Review of 2000's Campaign

- Improvements in the methodology
- Technical Tolerances
- Controls of durum Wheat?
- Controls of Reference Year ?

Improvements and trends

- **Main improvements**

Declaration Input →

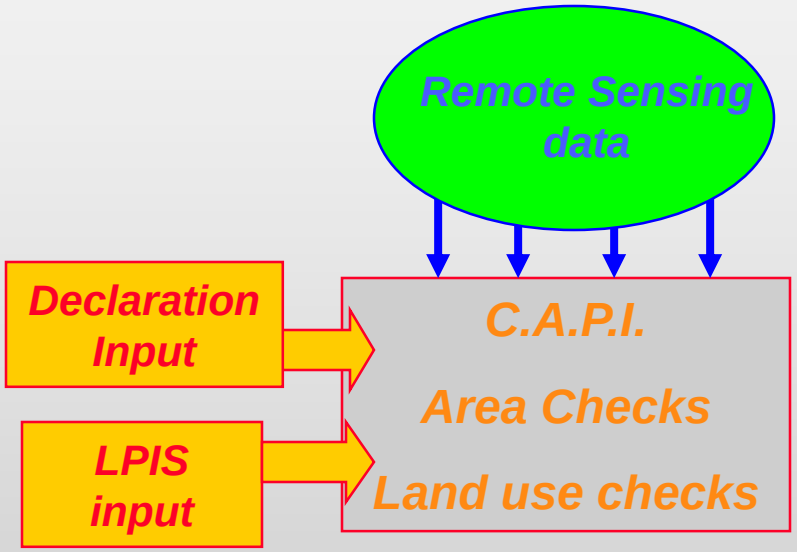
LPIS input →

Improvements and trends

- **Main improvements**

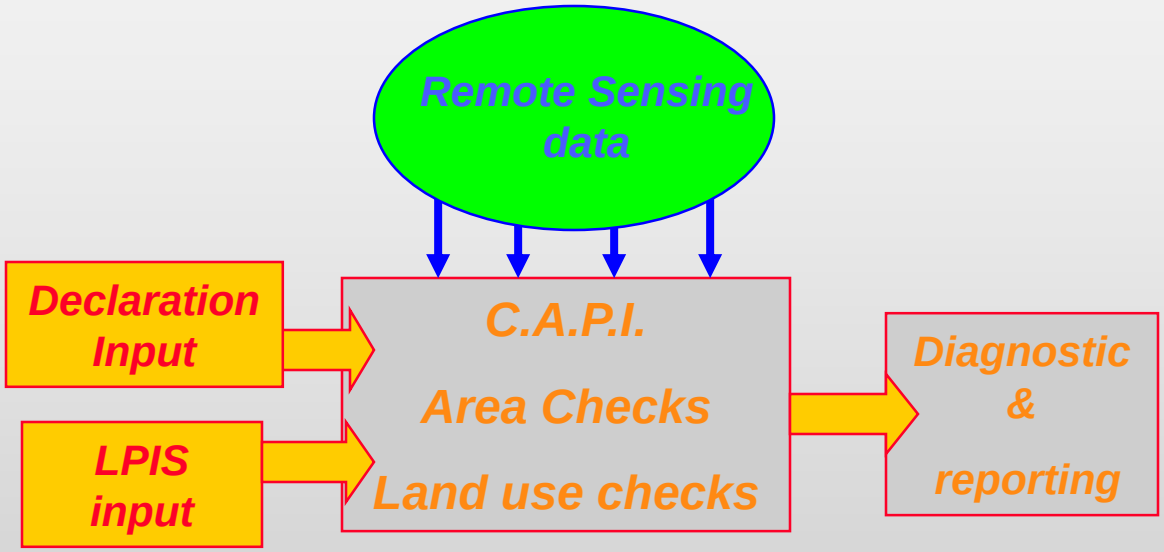
Improvements and trends

- **Main improvements**



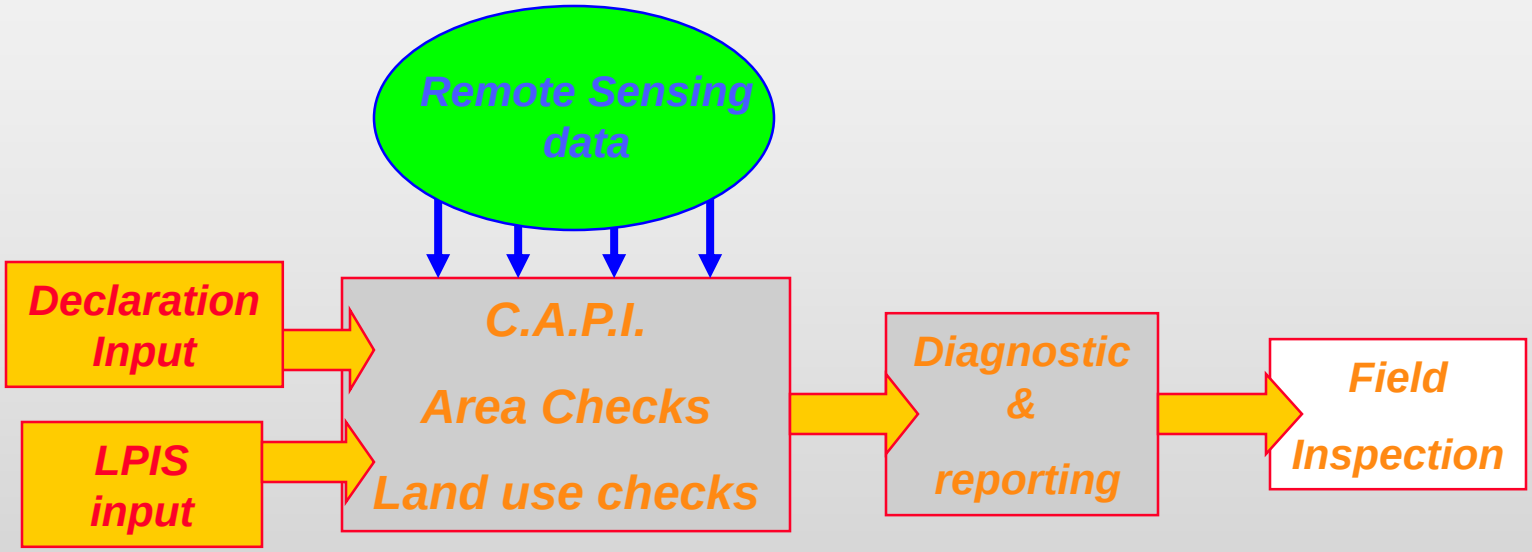
Improvements and trends

- **Main improvements**



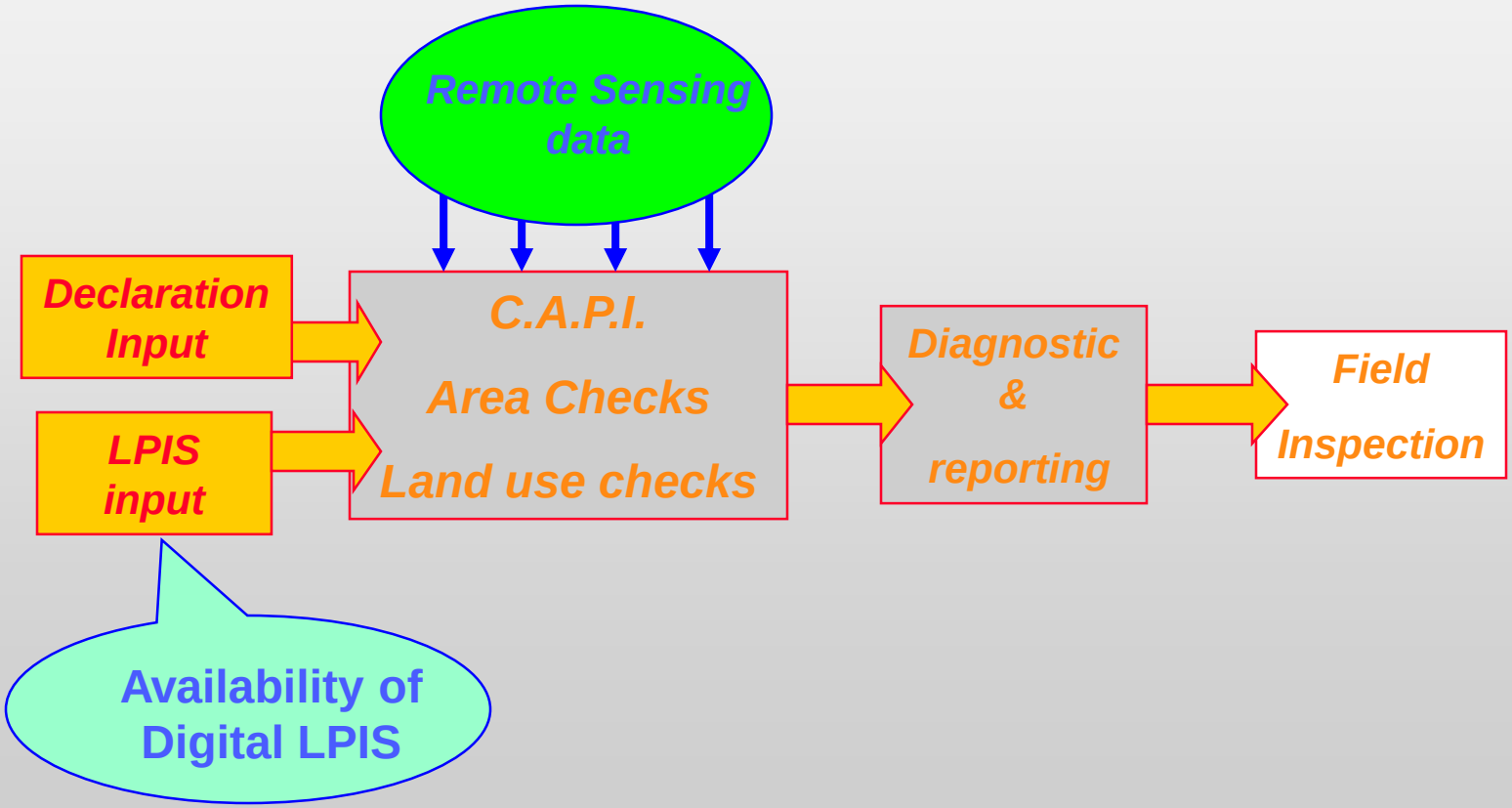
Improvements and trends

- **Main improvements**



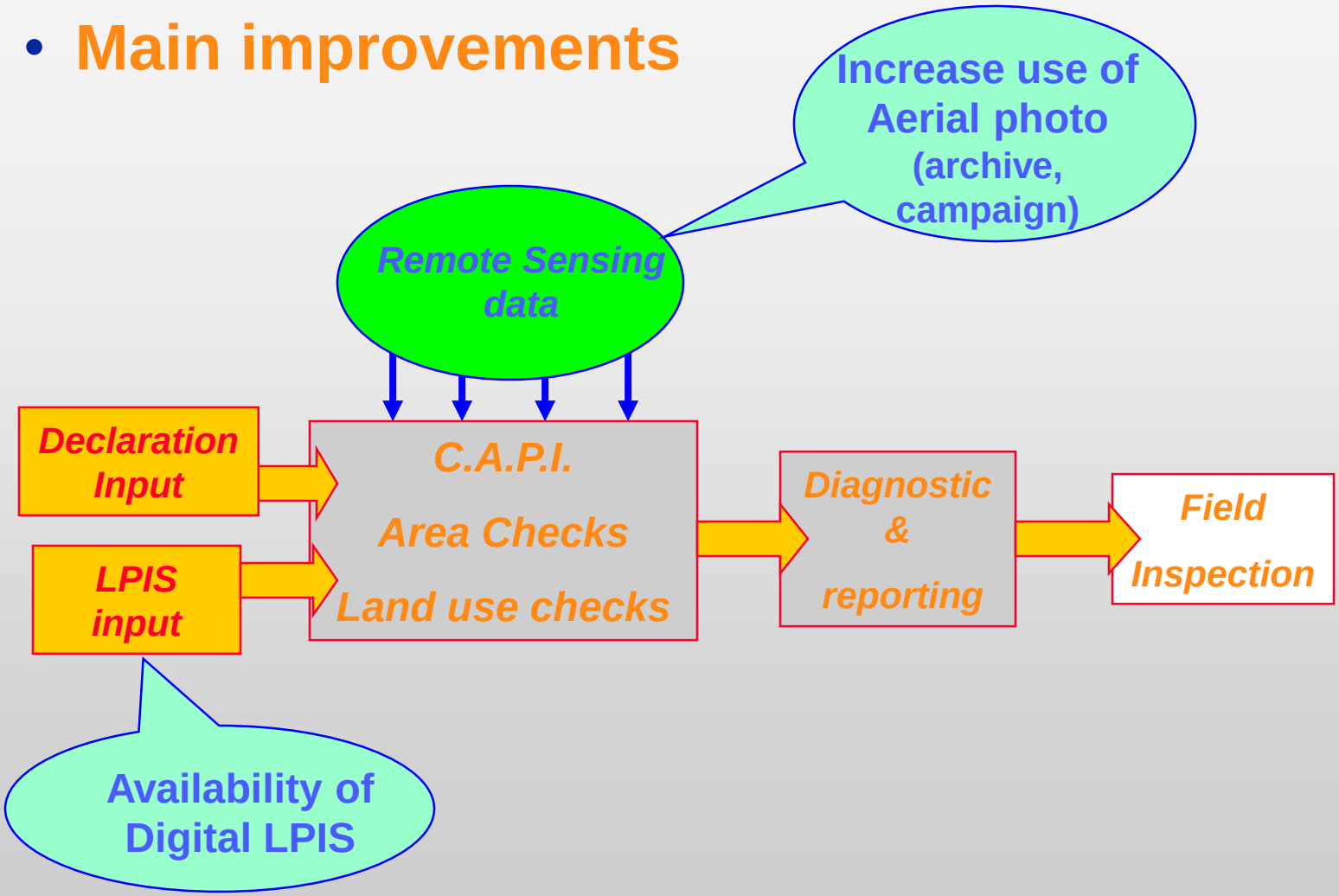
Improvements and trends

- **Main improvements**



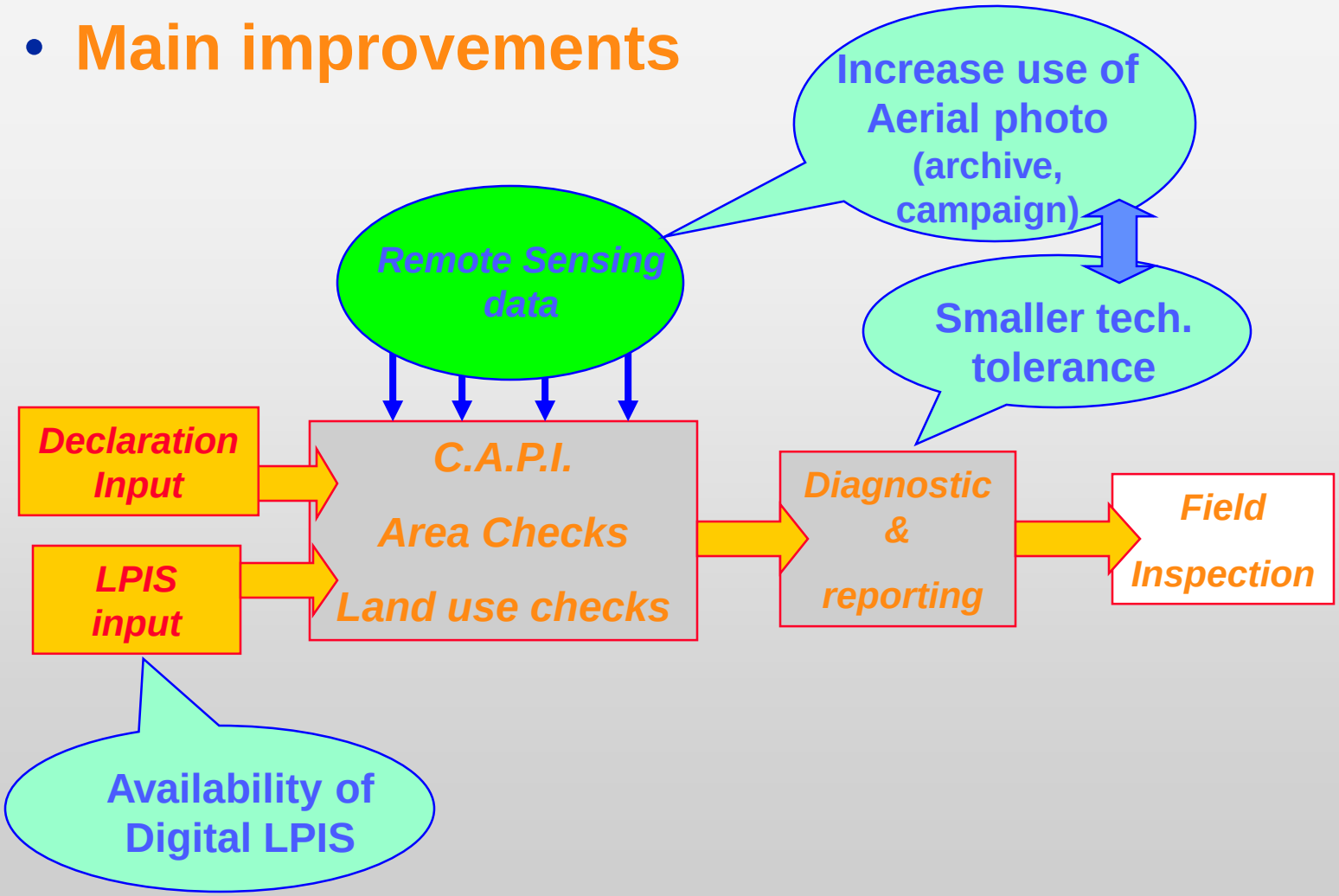
Improvements and trends

- **Main improvements**



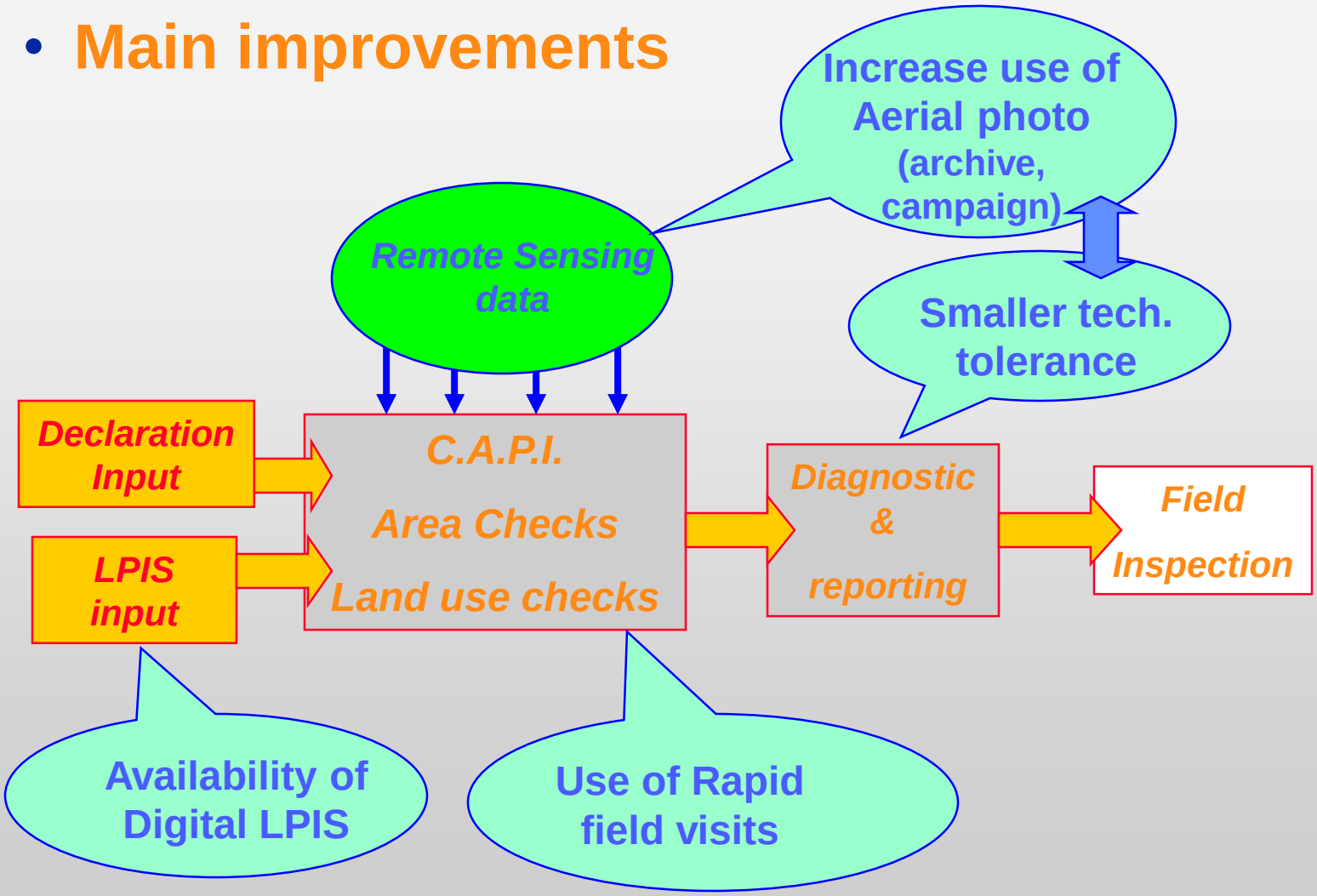
Improvements and trends

- **Main improvements**



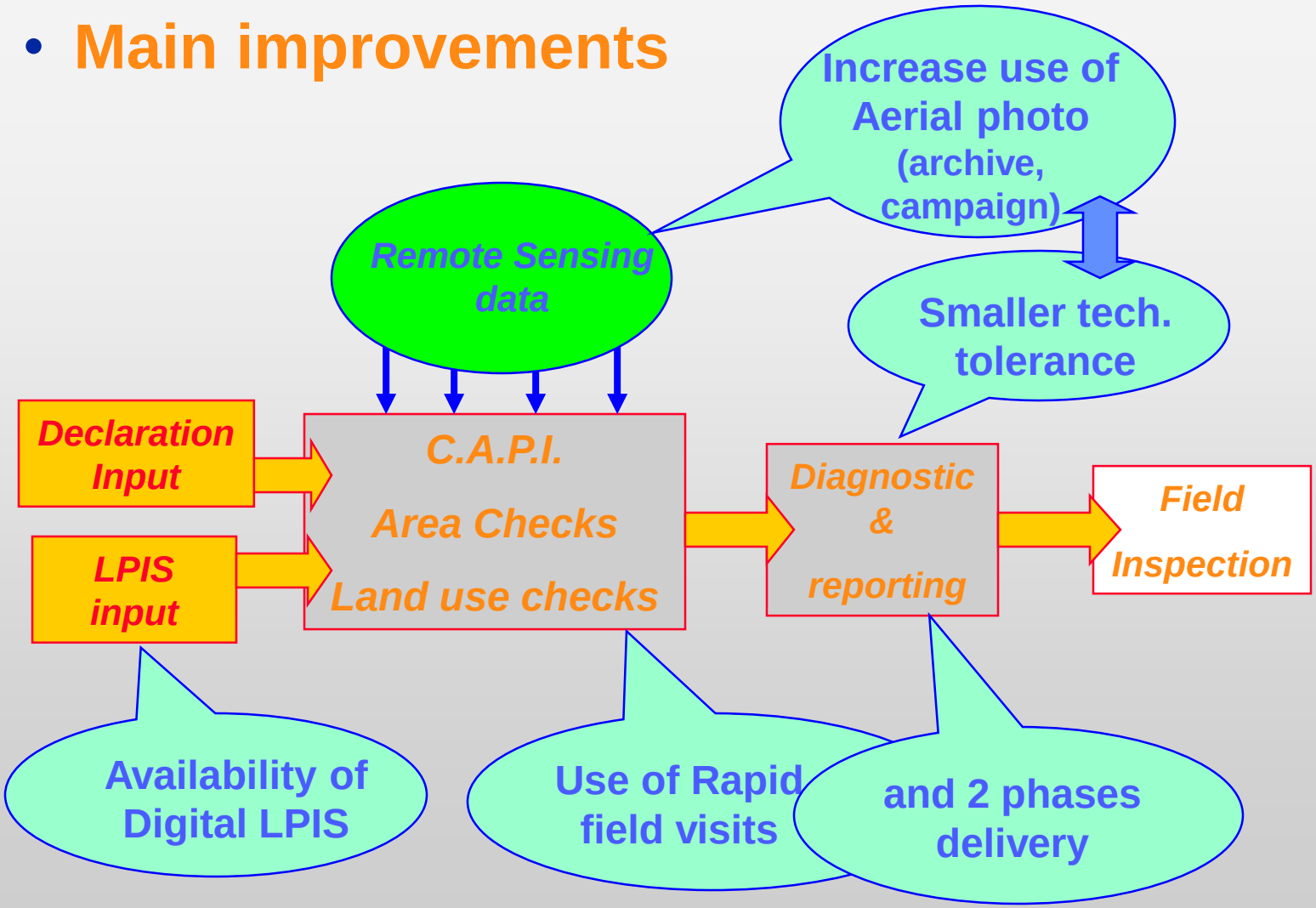
Improvements and trends

- **Main improvements**



Improvements and trends

- **Main improvements**

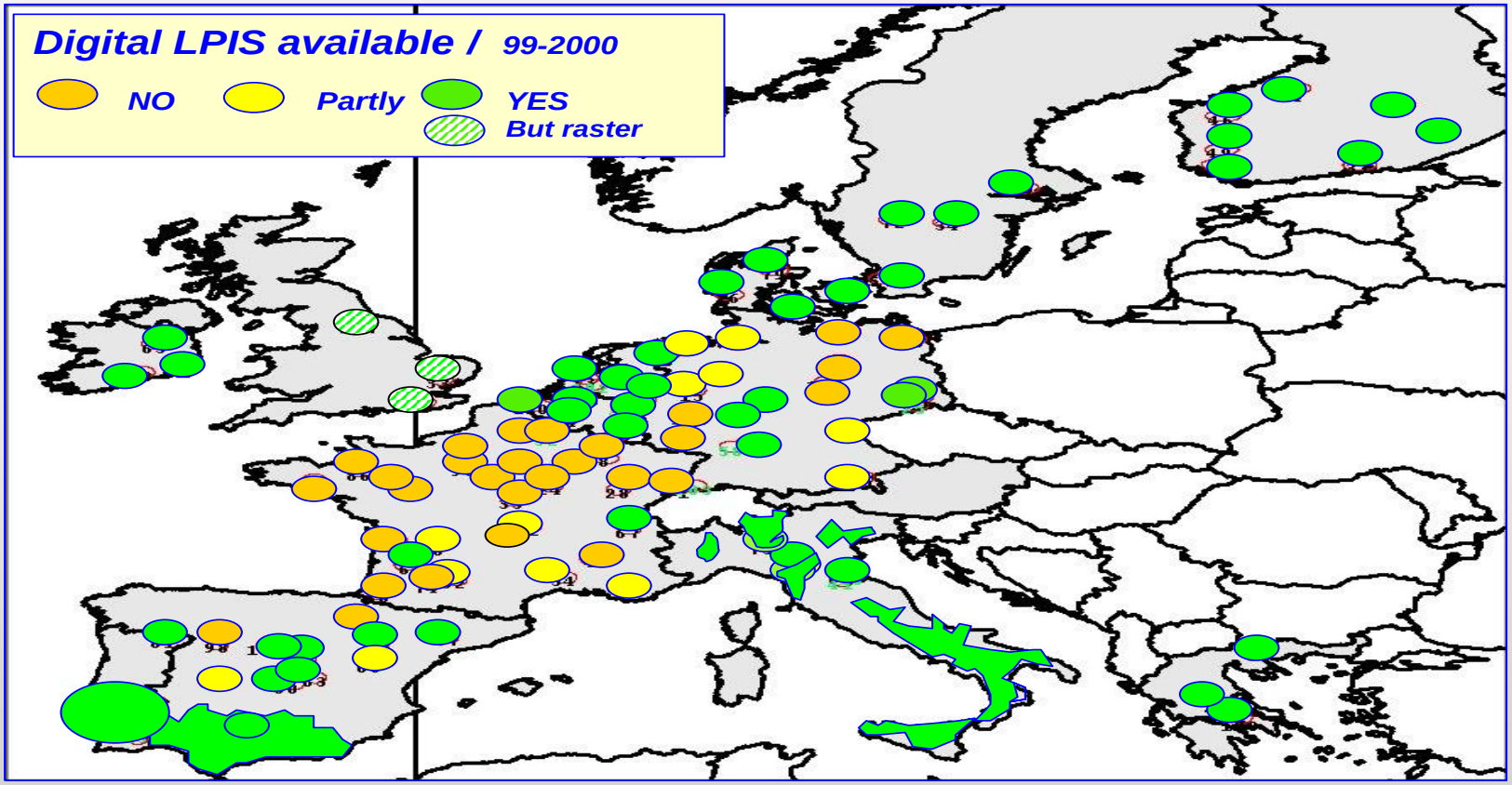


Improvement and trends

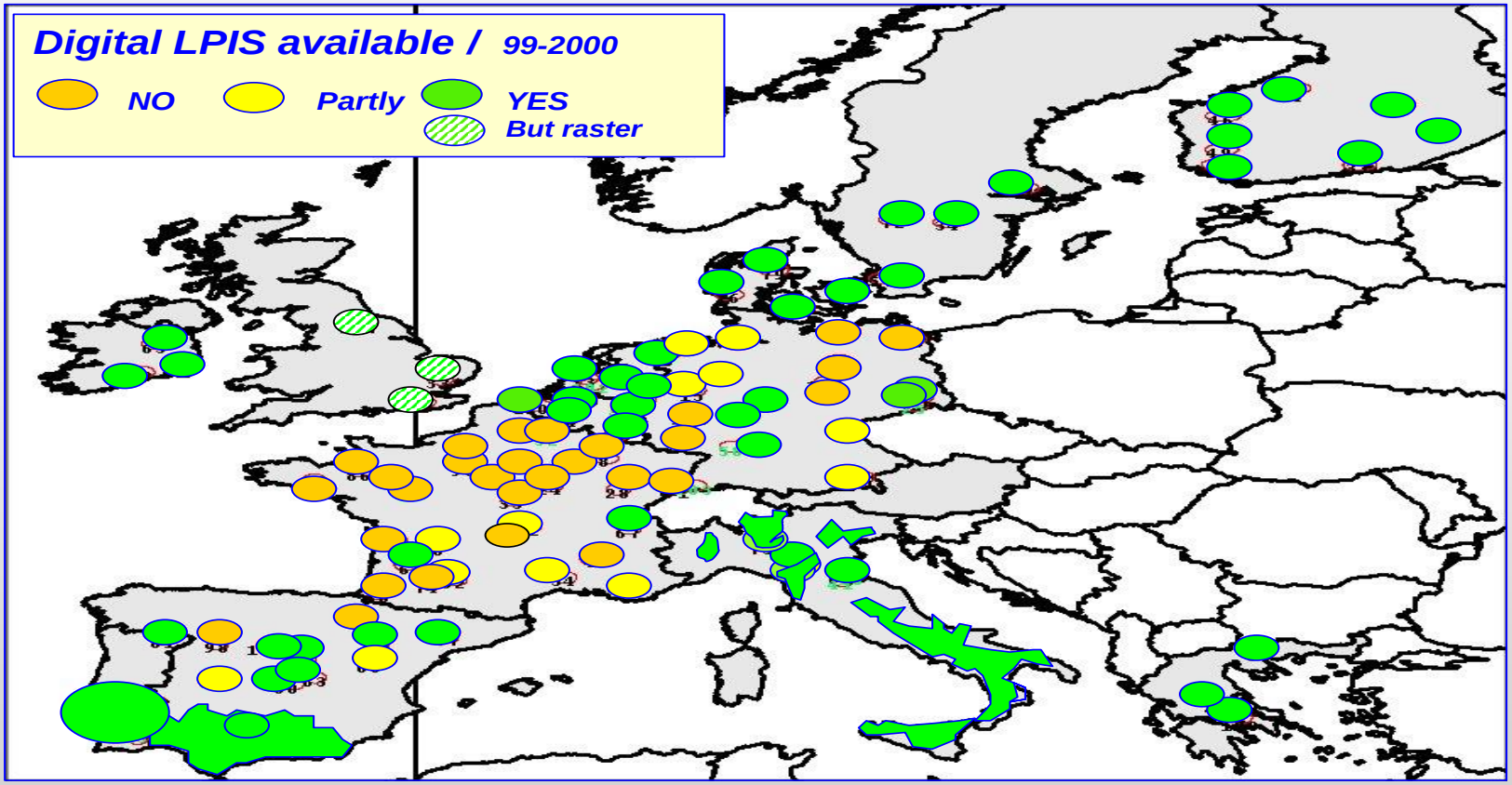
- **Digital maps are available**
  - Various reasons
    - Digitisation by Cadastre (L. Survey)
    - Use of maps digitised for previous Control
    - Benefits from OLI GIS
  - Consequences
    - Lower costs
    - improvement of the schedule

⇨ *Trend should reinforce in the frame of new Regulation on LPIS (1593/00)*

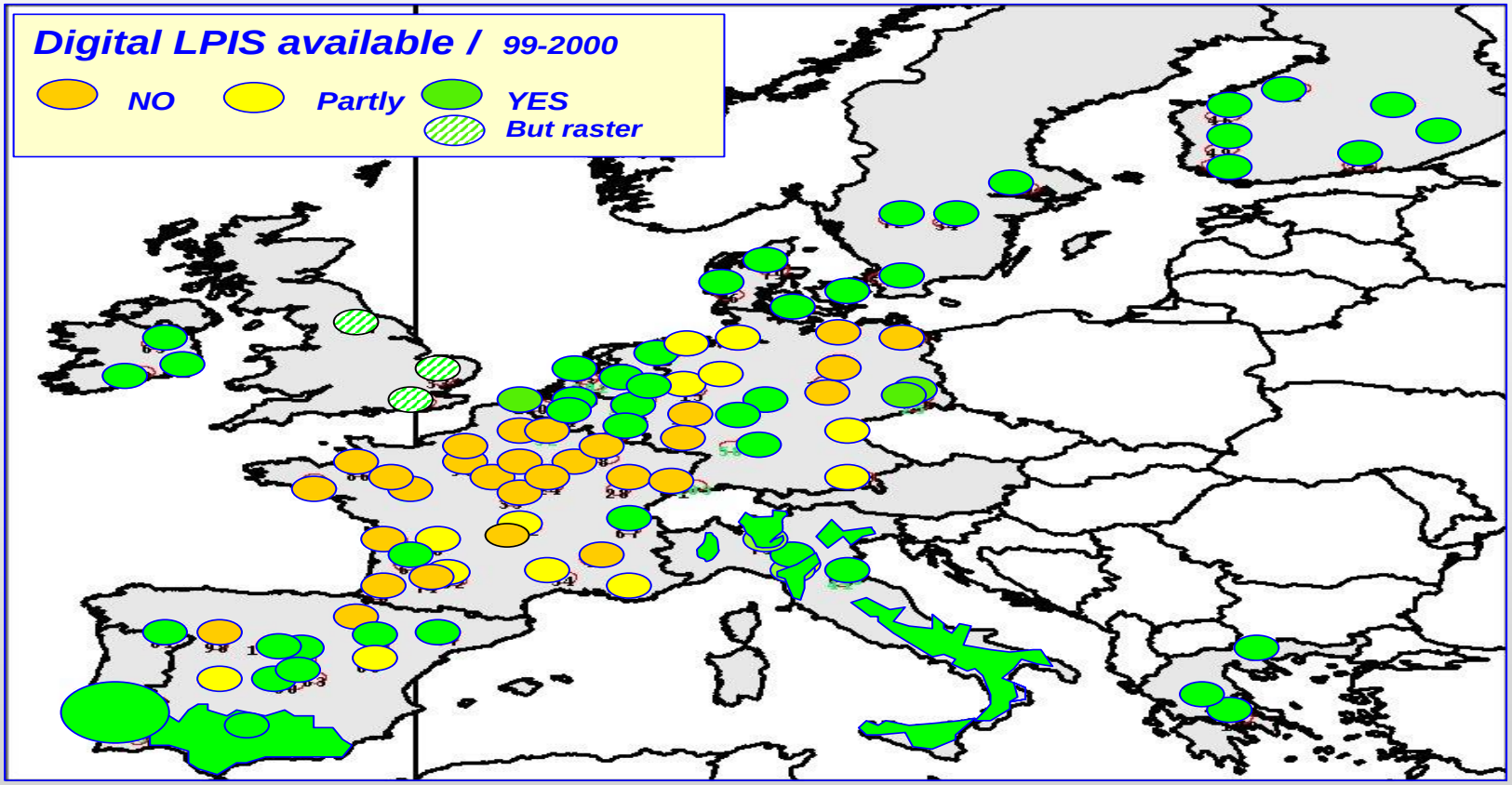
Improvement and trends



Improvement and trends



Improvement and trends



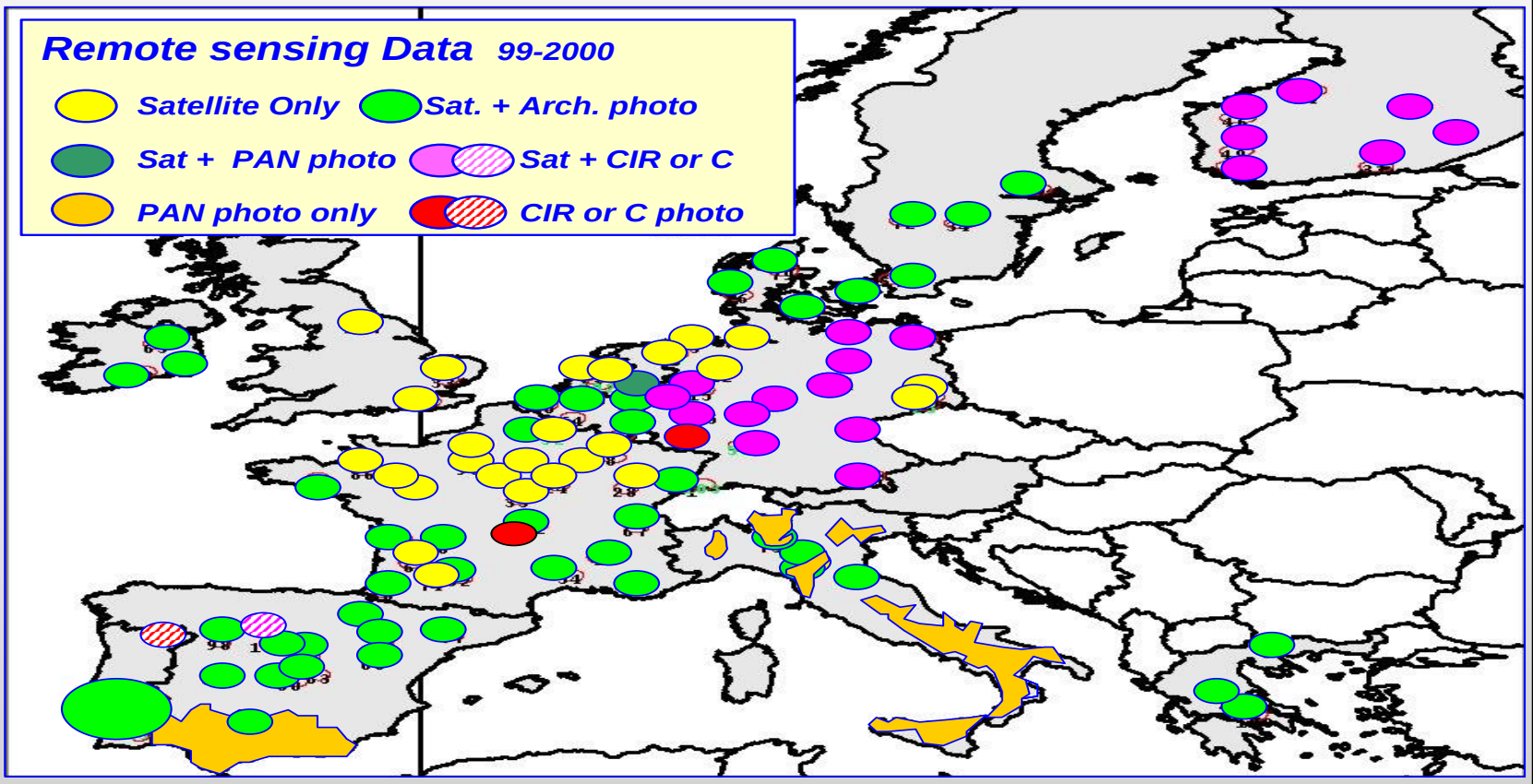
Improvement and trends

- **Increase use of Aerial photo**
  - Various reasons
    - Recommendation of DG AGRI / JRC
    - independent of Sat acquisition (R.F.V)
    - Synergy with LPIS
  - Consequences
    - Improve parcel measurement
    - Accurate field documents
    - Future place of VHR satellites??

⇨ *Trend should continue - Recommendation on parcel measurements applicable in 2001*

⇨ *Medium term Very High Resolution Sat.*

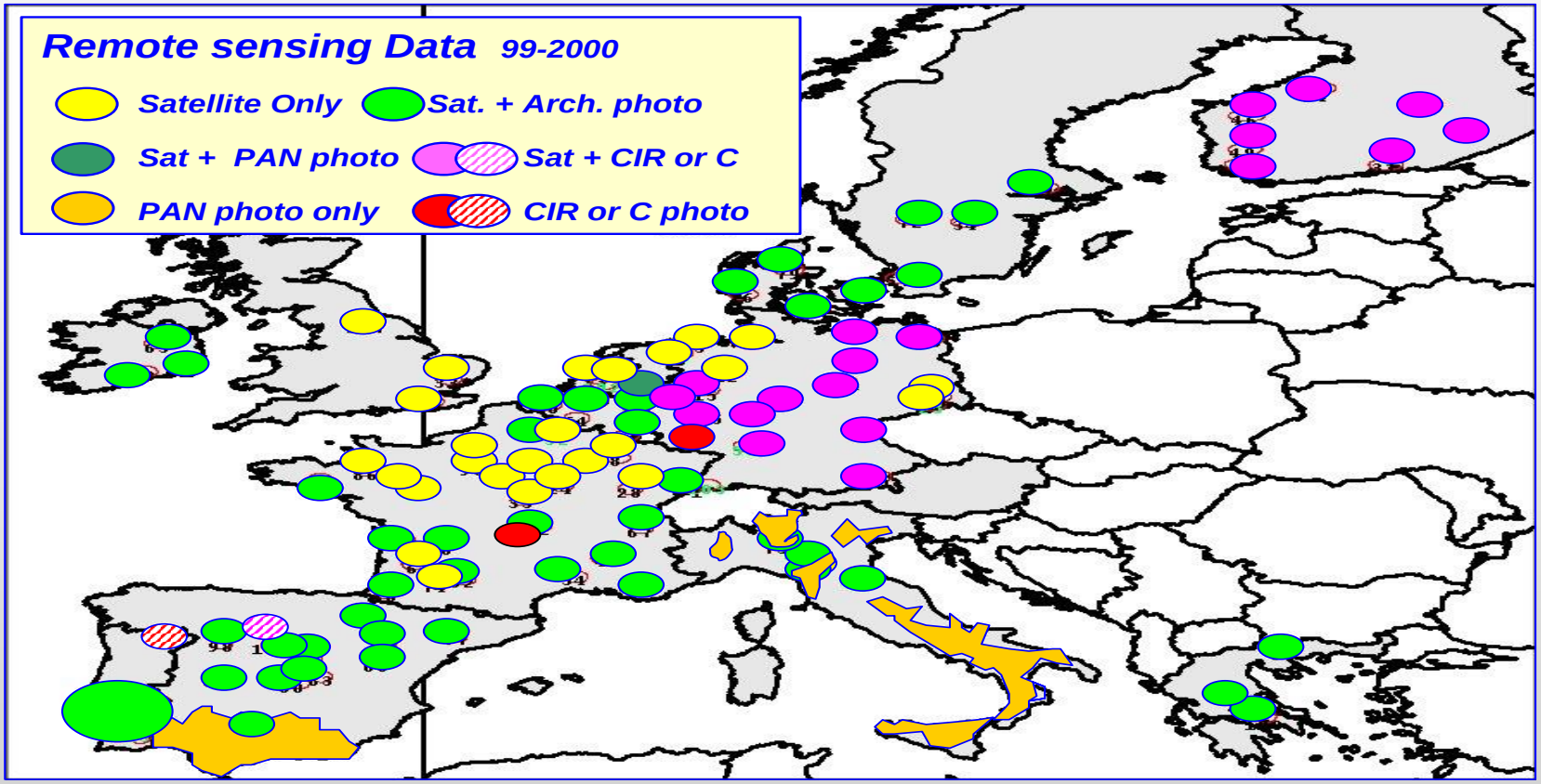
Improvement and trends



Improvement and trends

Space Applications Institute

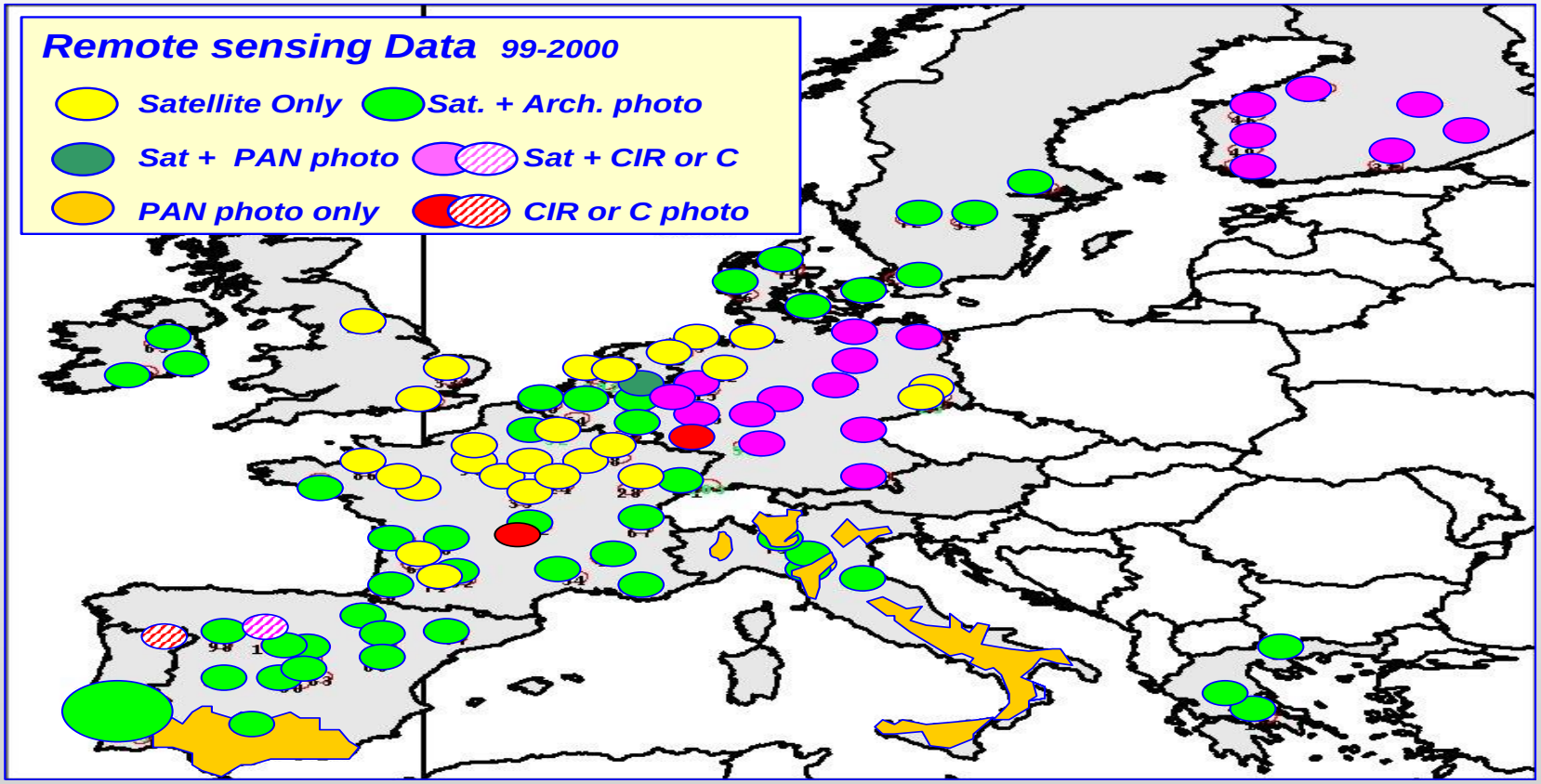
MARS Projet



Improvement and trends

Space Applications Institute

MARS Projet

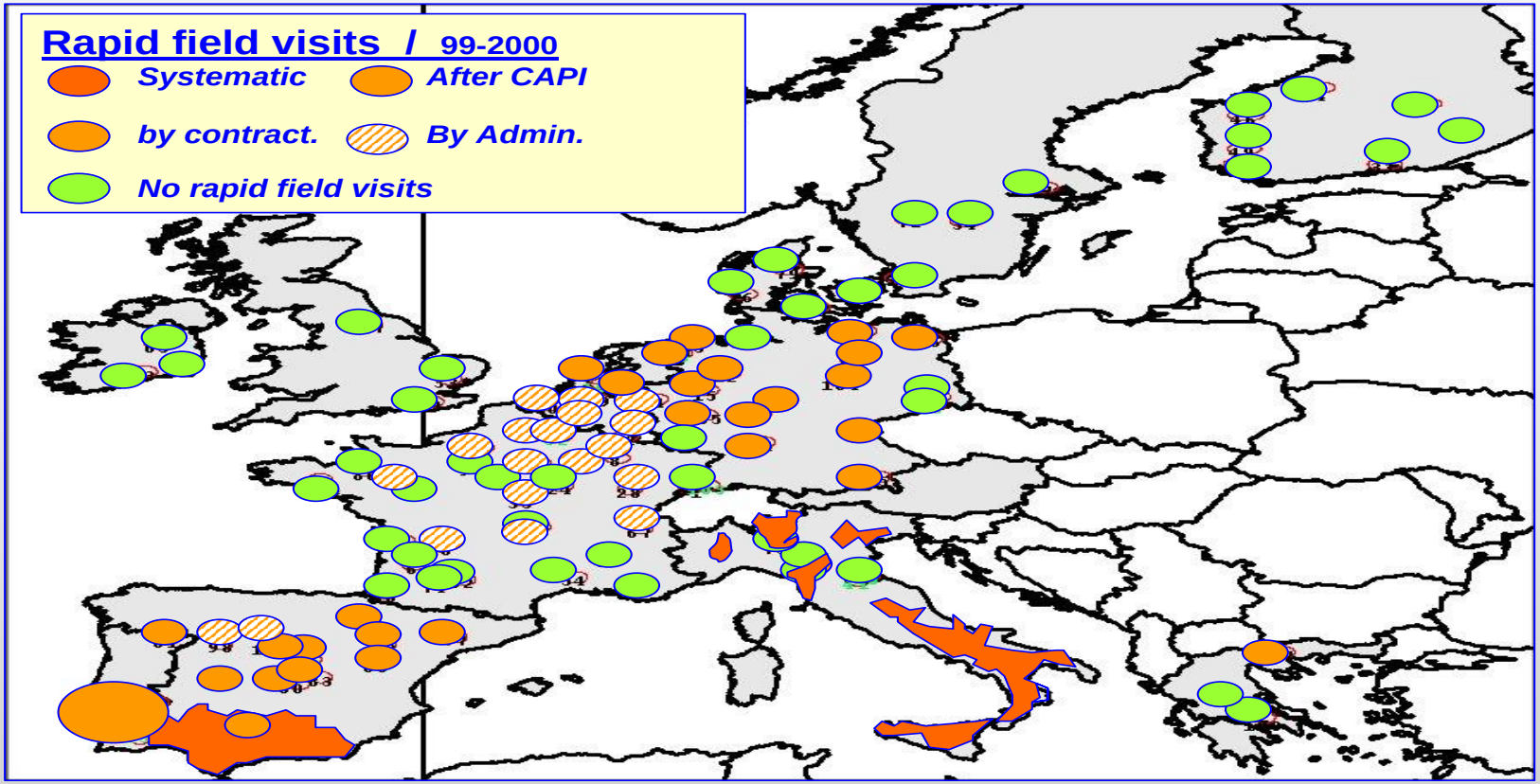


Improvement and trends

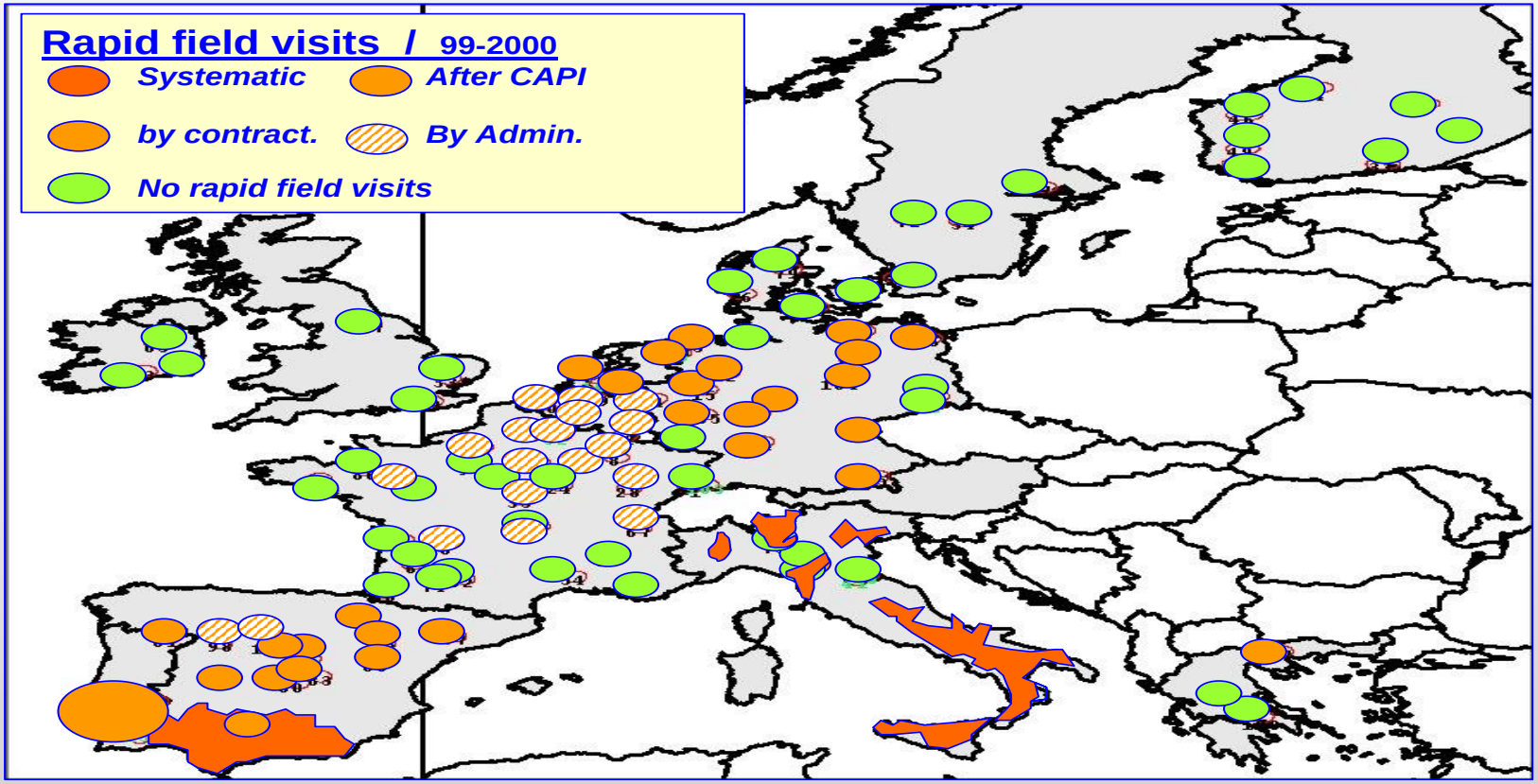
- **Rapid field visits**
  - Objectives
    - Improve check of land use
    - replace last image?
    - Check crops & features non visible / RS?
    - Various sampling key / visit rates
  - Consequences
    - Improve schedule
    - Involvement of reg. Administrations?

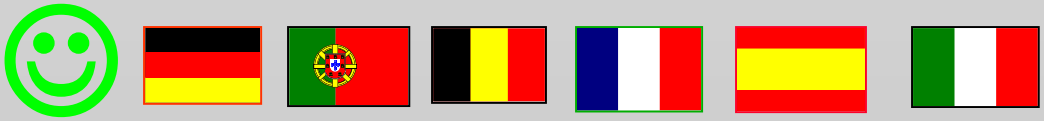
⇨ *Trend should reinforce in the frame of new Regulation on LPIS (1593/00)*

Improvement and trends

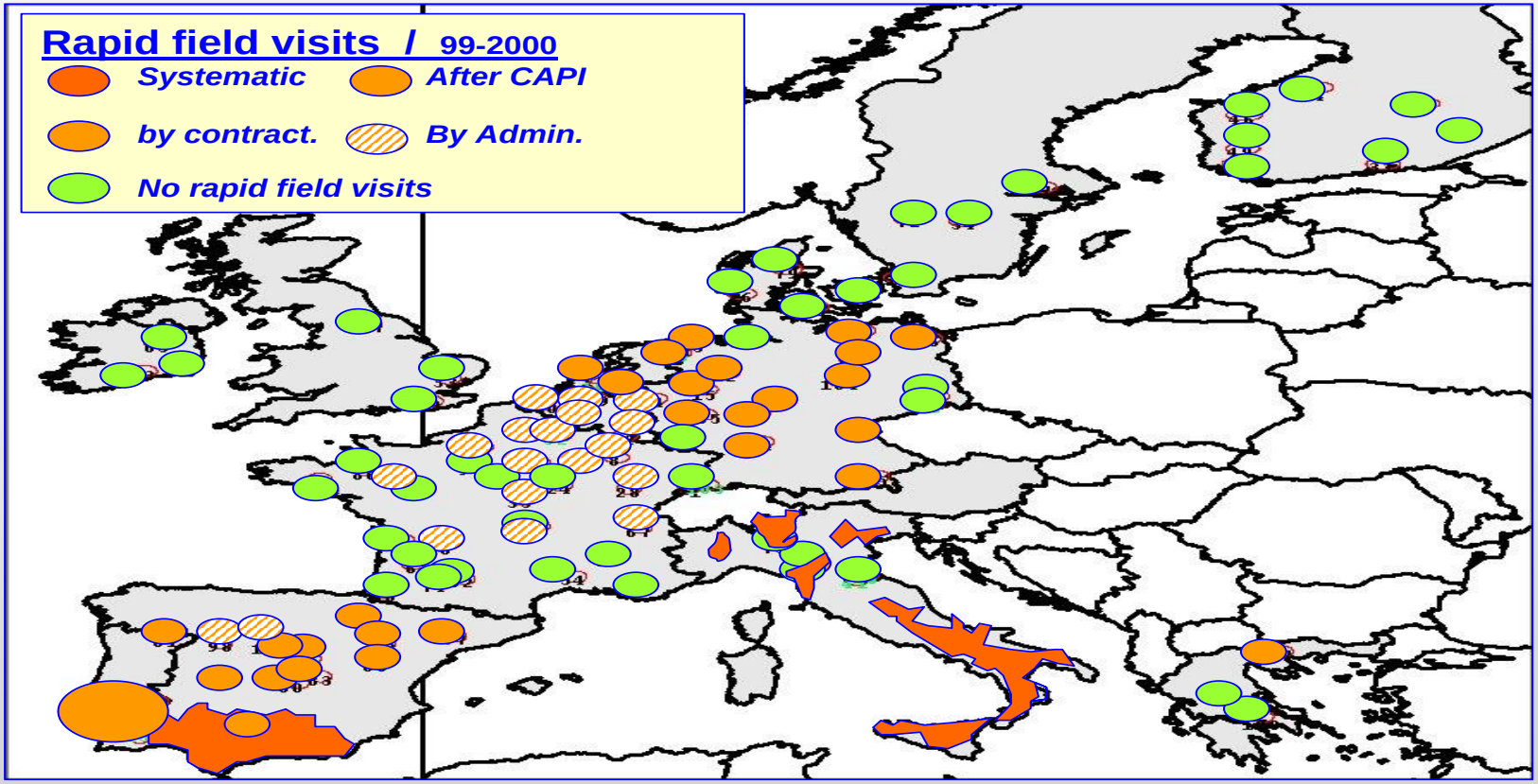


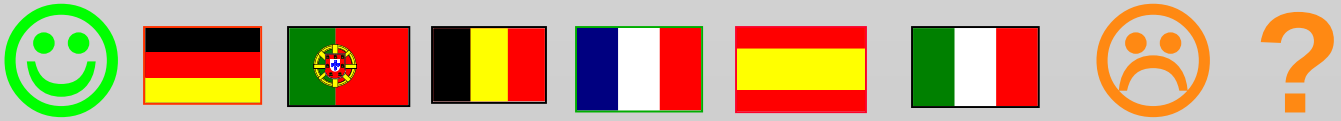
Improvement and trends





Improvement and trends



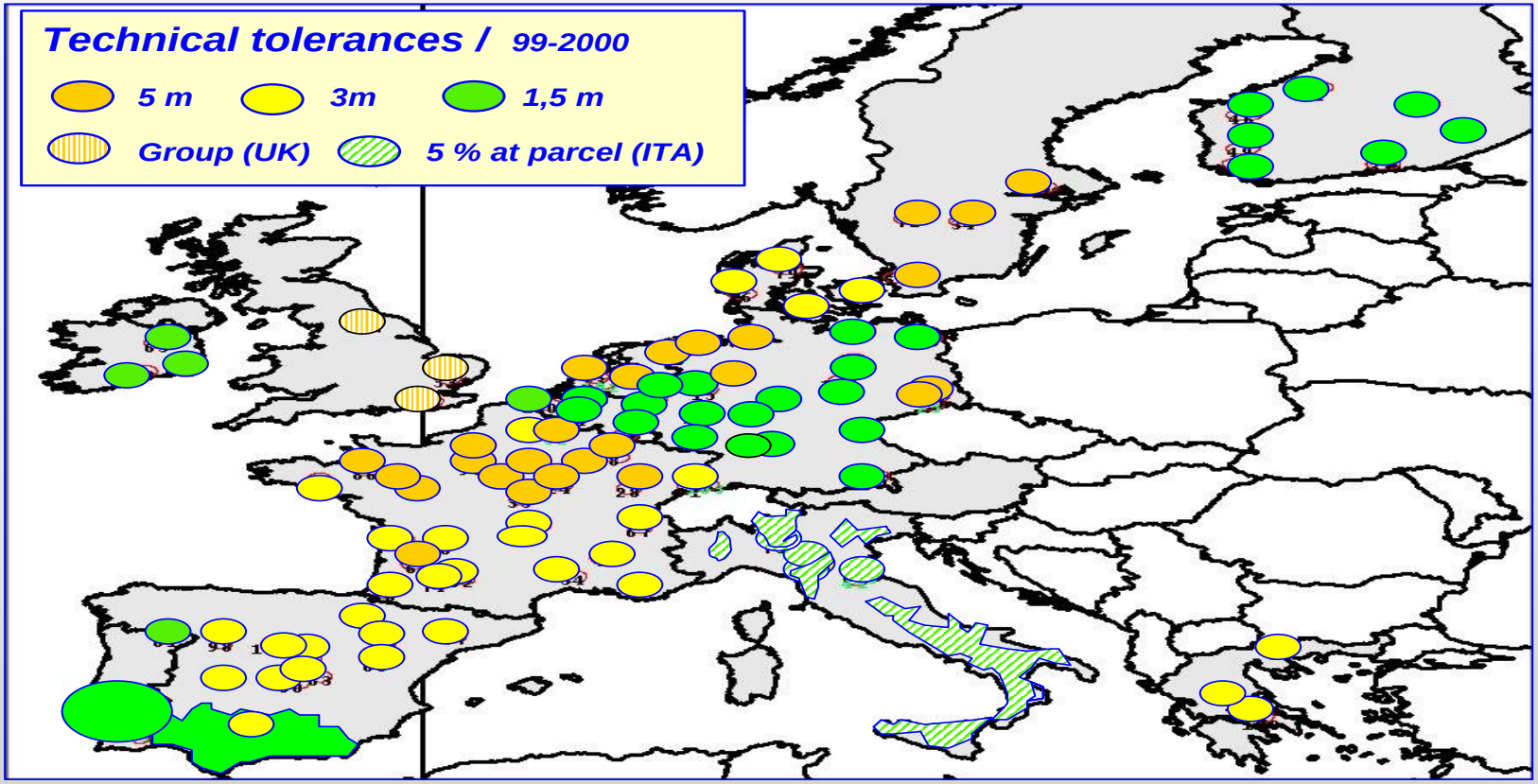


Improvement and trends

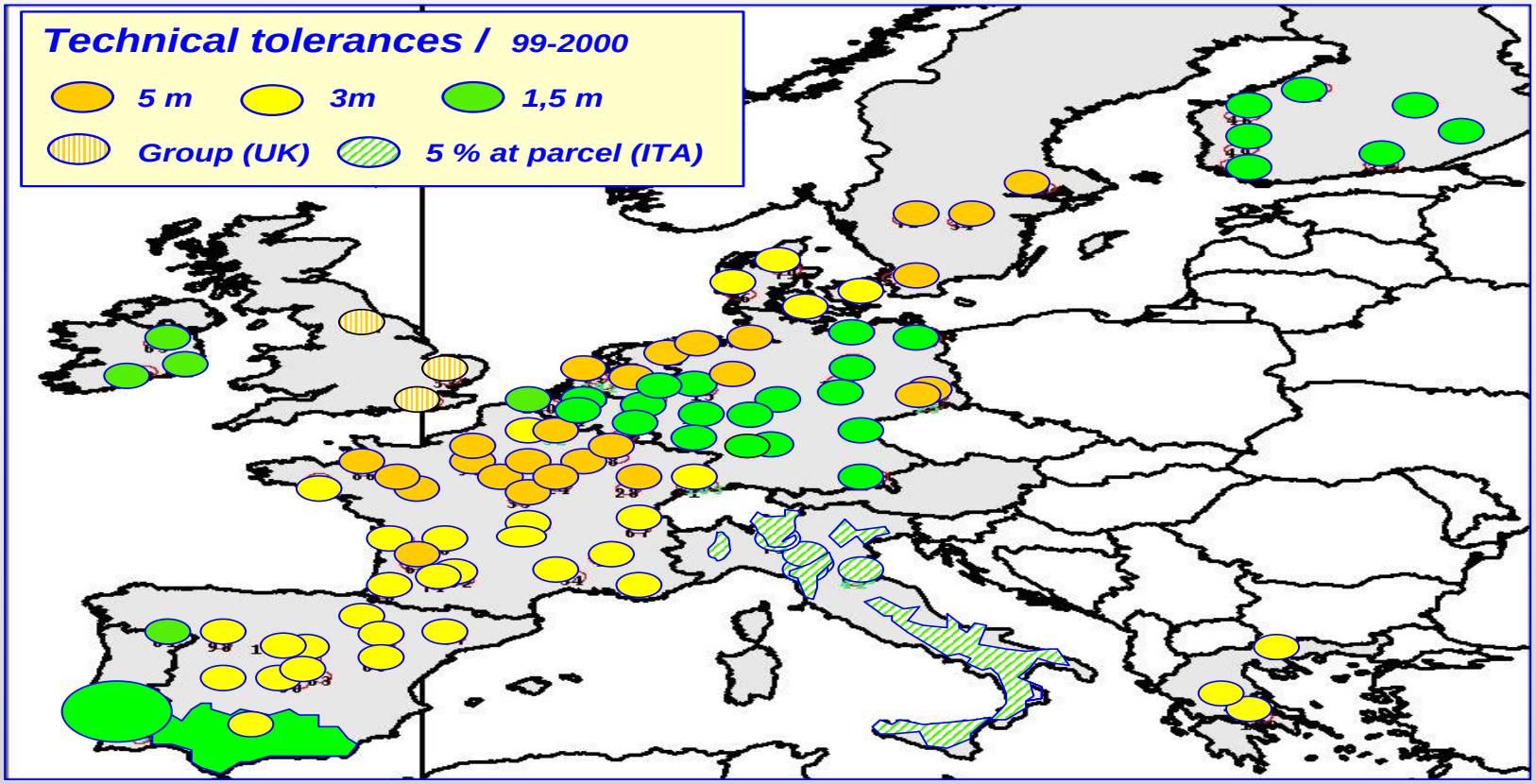
- **Technical tolerances are reinforced**
  - Various reasons
    - Recommendation of DG AGRI and JRC
    - Use of Archive / campaign orthophoto
  - Consequences
    - checks of area improved
    - increase of rejected dossiers/groups

⇨ *Trend should continue /stabilise - Recommendation on parcel measurements (DG AGRI 5% accuracy Target) applicable in 2001*

Improvement and trends



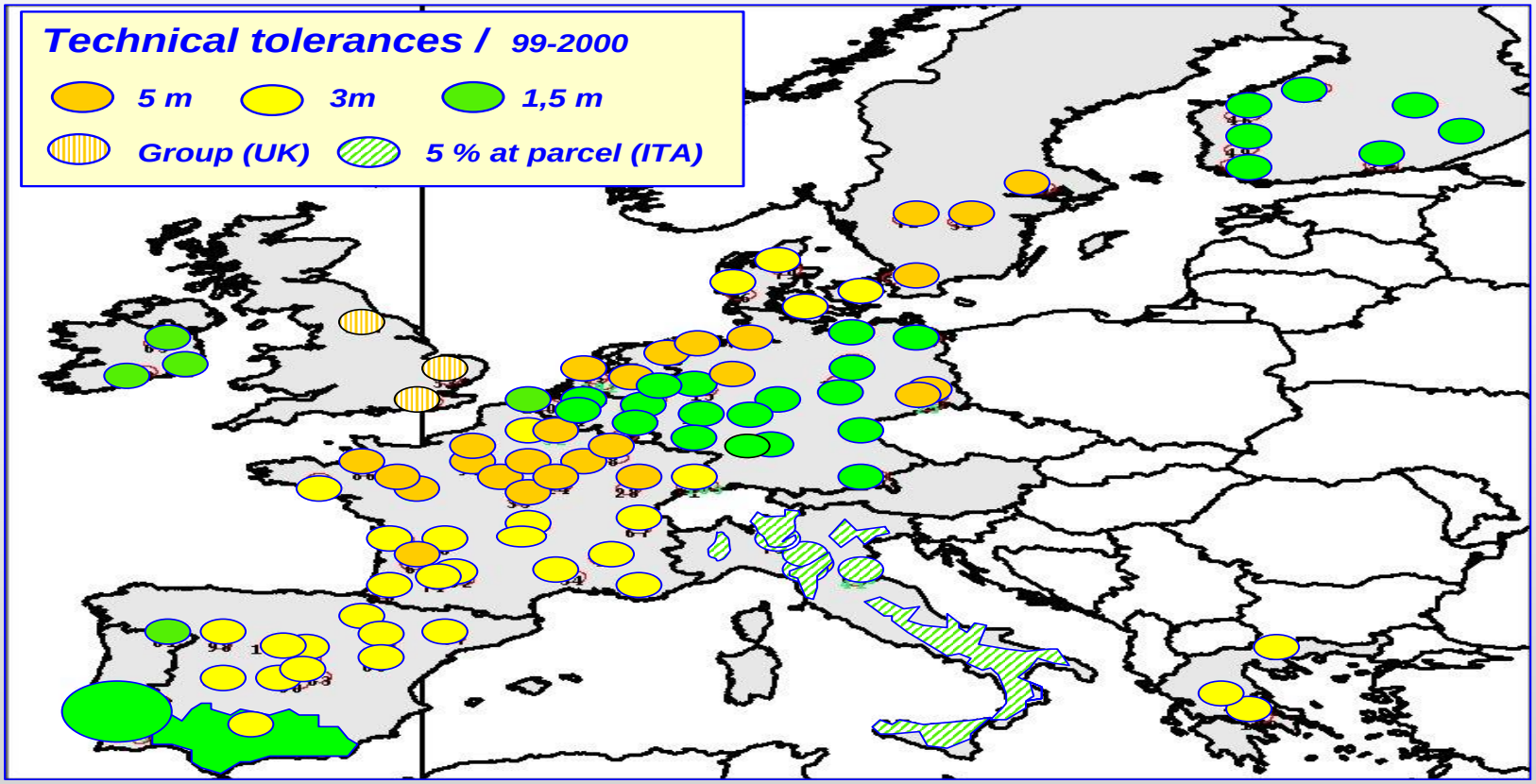
Improvement and trends



Improvement and trends

Space Applications Institute

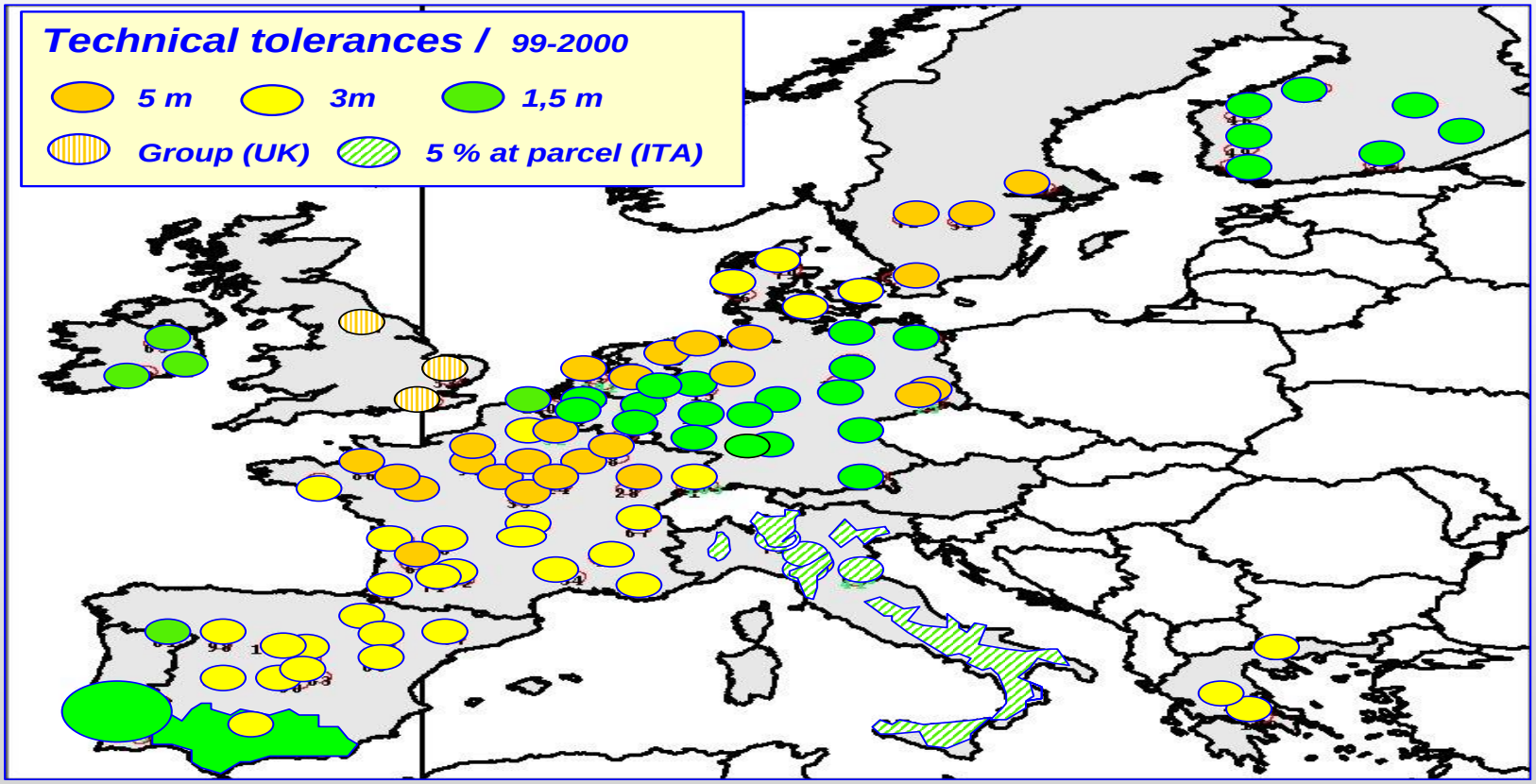
MARS Projet



Improvement and trends

Space Applications Institute

MARS Projet



Space Applications Institute

MARS Projet

Review of 2000's Campaign

- Improvements in the methodologies
- Technical Tolerances
- Controls of durum Wheat?
- Controls of Reference Year ?

Technical tolerances

- **Smaller Buffer and increase of rejection rate**

PARCELS	1999		2000		Increase %
	T. Tolerance Meters	Rejected PAR. %	T. Tolerance Meters	Rejected PAR. %	Rejected PAR
Be	3	18,5	1,5	32,1	74%
DK	na	na	3	18,6	
D/ Eftas	6	10,9	1,5 / 5,0	20,7	90%
D/ Gaf	2	4,1	1,5 / 5,0	6,6	61%
ESP	6	8,7	3	11,4	31%
ESP / And	2	47,1		na	
FIN	2	9,9	1,5	14,5	46%
FR/ Scot	5	1,9	3,0 / 5,0	2,4	26%
FR/ Sirs	5	6	1,5 / 5,0	12,1	102%
GR/ Geo/ El	6,2	7,7	3	31,6	310%
GR/ Era	6,2	13,3	3	33,2	150%
IRL	na	24,3	1,5	30,1	24%
ITA/ Sat	na	24,2	na	na	
ITA/ aero	na	40,8	na	na	
NL	6	11,1	1,5 / 5,0	14	26%
Ost	2	8,3	na	na	
P/ Geom.	na	na			
P/ Terr.	na	na	1,5	19,1	
SW	5,0 / 6,0	na	4,3 / 5,2	5,3	
UK	na	na	na	na	

Technical tolerances

- **Smaller Buffer and increase of rejection rate**

GROUPS	1999		2000		Increase %
	T. Tolerance Meters	Rejected GR. %	T. Tolerance Meters	Rejected GR. %	Rejected GR
Be	3	13,2	1,5	14,3	8%
DK	6	8,4	3	11,2	33%
D/ Eftas		7,4	1,5 / 5,0	9,1	23%
D/ Gaf	2	4,8	1,5 / 5,0	5,7	19%
ESP	6	23,4	3	24,4	4%
ESP / And	2	30,4		na	
FIN	2	5,1	1,5	10,9	114%
FR/ Scot	5	3,1	3,0 / 5,0	3,7	19%
FR/ Sirs	5	4,7	1,5 / 5,0	*8,7*	85%
GR/ Geo/ El	6,2	34,1	3	25,7	-25%
GR/ Er	6,2	14,5	3	26,1	80%
IRL	na	12,9	1,5	6,9	-47%
ITA/ Sat	na	29,2	na	na	
ITA/ aero	na	35,4	na	na	
NL	6	10,7	1,5 / 5,0	13	21%
Ost	2	6,5	na		
P/ Geom.	na	21,7			
P/ Terr.	na	5,3	1,5	21,1	298%
SW	5,0 / 6,0	6,7	4,3 / 5,2	4,4	-34%
UK	na	2	na	2,4	20%

Technical tolerances

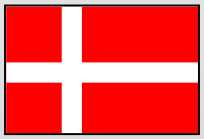
- **Smaller Buffer and increase of rejection rate**

DOSSIERS	1999		2000		Increase %
	T. Tolerance Meters	Rejected Dos. %	T. Tolerance Meters	Rejected Dos. %	Rejected Dos.
Be	3	24,6	1,5	23,8	-3%
DK	na	15,8	3	19,2	22%
D/ Eftas	6	11,9	1,5 / 5,0	13,1	10%
D/ Gaf	2	6,4	1,5 / 5,0	8	25%
ESP	6	44,9	3	45,9	2%
ESP / And	2	46,4	1,5		
FIN	2	9,2	1,5	20,2	120%
FR/ Scot	5	8,9	3,0 / 5,0	11,7	31%
FR/ Sirs	5	16,9	1,5 / 5,0	*18,5*	9%
GR/ Geo/ El	6,2	43,3	3	27,4	-37%
GR/ Er	6,2	16,2	3	29,1	80%
IRL	na	20,1	1,5	8,5	-58%
ITA/ Sat	na	51,4	na	na	
ITA/ aero	na	55,3	na	na	
NL	6	12,6	1,5 / 5,0	11,1	-12%
Ost	2	1,4	na	na	
P/ Gem.	na	50,3	1,5		
P/ Terr.	na	11,4	1,5	34,4	202%
SW	5,0 / 6,0	10,6	4,3 / 5,2	10,2	-4%
UK	na	10,2	na	13,4	31%

Technical tolerances

- **Smaller Buffer and increase of rejection rate**

- Belgium decided to apply 1,5m (even with archive LPIS orthophoto)
- After a small study showing that rejection rates and dossiers rejected are stabilised (do not increase) for smaller values



- Denmark applied 3m parcel tolerance in 2000
- Simulation were done / group on 98 /99 data
- Increase of rejected dossiers: 8% with 6m
  20% with 3m.

- Mean results hide stronger variations of rejected dossiers
- M.V. (1.5m): D rej = 33 % (> + 200 %)
- NI., SN (5m) D rej = 6 - 15 % (< + 50 %)

Technical tolerances

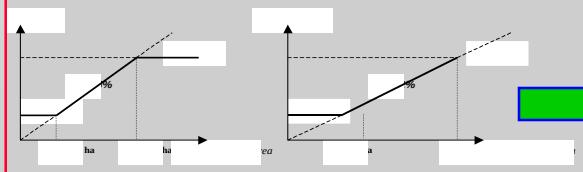
- **Main concern : recommendation on parcel measurement (version 6 of Annex / DG.AGRI's ref. VI/8388/94)**

Annex to DOC VI/8388/94-EN version 6

Maximum tolerances for parcels (2000 harvest)

	Method	Calculation of tolerance
A :	Images Spot Pan	5 m x perimeter
	Planimeter	5%
	Topofil, tape, wheel, lath	5%
	Orthoimages (screen, pixel 1m)	1.5 m x perimeter[1]
	Differential GPS (code)	1.25 m x perimeter
B :	Total station, geodesic GPS (phase)	2%

- The method of measurement must be adapted to the parcel size in the concerned, so that as from 2001 onwards the objective of a 5% tolerance is half the areas checked.
- A minimum tolerance of 2 ares may be applied to take account of errors in rounding.
- The technical tolerance must not exceed 1,0 ha.
- For rapid measurements (Part A of the table), the area measured must not exceed the official area (land registry, LPIS).



[1] The same tolerance applies for the computerised administrative checks based on the areas established when the Land Parcel Identification System (LPIS) was set up, on the basis of orthoimages.

Table indicating Maximum tolerance applicable (according to measurement methods)

- Applicable in 2000

Four Bullets

- Applicable in 2000 or 2001

Two graphs (explanatory)

Technical tolerances

- **Maximum T. tolerance in Annex ref. VI/8388/94**

Annex to DOC VI/8388/94-EN version 6
Maximum tolerances for parcels (2000 harvest)

Method		
A :	Images Spot Pan	5 m x perimeter
	Planimeter	5%
	Topofil, tape, wheel, lath	5%
	Orthoimages (screen, pixel 1m)	1.5 m x perimeter[1]
	Differential GPS (code)	1.25 m x perimeter
B :	Total station, geodesic GPS (phase)	2%

- The table indicates maximum values... Smaller tolerances may be applied, (according to risk analysis)
- These values are integrating all the error factors No real need for further calculation...
  - Ortho-image? Includes both aerial or VHR satellite data

Technical tolerances

- **Maximum T. tolerance in Annex ref. VI/8388/94**

Annex to DOC VI/8388/94-EN version 6

Maximum tolerances for parcels (2000 harvest)

Method

A :	Images Spot Pan	5 m x perimeter
	Planimeter	5%
	Topofil, tape, wheel, lath	5%
	Orthoimages (screen, pixel 1m)	1.5 m x perimeter[1]
	Differential GPS (code)	1.25 m x perimeter
B :	Total station, geodesic GPS (phase)	2%

- 1/2 Pixel for Sat. // 1,5 pixel for ortho image?
  These values are integrating practical consideration : No requirement to work at half pixel when using ortho images ! But still possible locally, for small parcels.
- Coherence with JRC specs and recommendations?
  The 3 m value is proposed by JRC to take into account archive photos (LPIS or not) combined with satellite data…

Technical tolerances

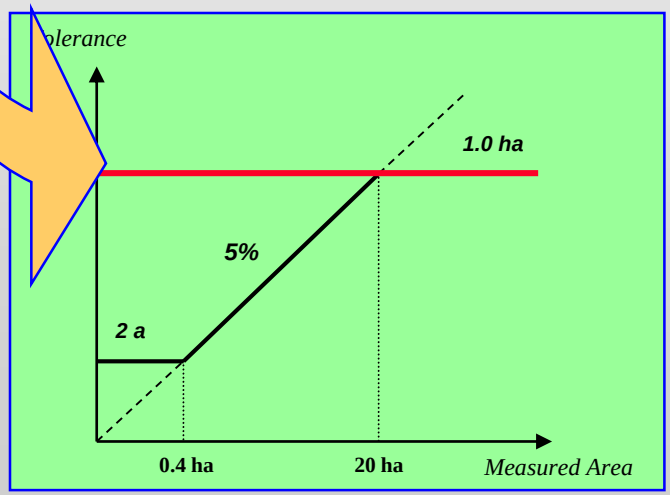
- **The four bullets in Annex ref. VI/8388/94**

  - The method of measurement must be adapted to the parcel size in the region concerned, so that as from 2001 onwards the objective of a 5% tolerance is met for half the areas checked.
  - A minimum tolerance of 2 ares may be applied to take account of errors in rounding.
  - The technical tolerance must not exceed 1,0 ha.
  - For rapid measurements (Part A of the table), the area measured must not exceed the official area (land registry, LPIS).

- 3rd point: Important, normally applicable in 2000, but not well understood…
- 4th point: Rather important and concerns RS. Controls
- 2nd point: A "may" without consequences and not really of concern for control with Remote sensing (rounding)
- 1st point: Critical but applicable only next campaign 2001… JRC recommended tests and analyses in 2000

Technical tolerances

- **Ceiling of Technical tolerances to 1.0 ha ?**
  - Embarrassing: Why not apply uniformly the buffer effect ("real" Technical tolerance?)
  - More suitable to field control than RS.C
  - However need to be implemented in RS.C as recommended in JRC 2000's Tech Doc n°3.



- Not well understood and applied in 2000:

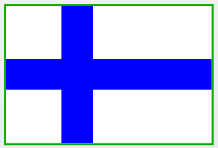

Technical tolerances

- **Ceiling of Technical tolerances to 1.0 ha ?**
  - How to understand it?
    - Progressive increase of risk of wrong rejection for the large parcels (confidence interval reduced) …
    - More a control strategy than purely technical" consideration..
  - More over, this ceiling doesn't implicate that all the parcel will be rejected
    - (But only if also Dp-Mp> 1 ha)
  - and it enters into accounts only for rather (very) large parcels (according to the Buffer applied)

Technical tolerances

A few results on 1 ha ceiling

- **SUOMI -Finland**



Not applied in 2000
Sum. analysis at JRC request

- T T Buffer: 1,5 m
- Mean parcel size: 2,2 ha
- 1 parc. concerned of 6 ha
- 1 Already C3+ (0,002%)

- **BELGIQUE**

Applied in 2000
Sum. analysis at JRC request

- T T Buffer: 1,5 m
- Mean parcel size: 2,3 ha
- 1 parc. Concerned … 30 ha
- 1 New C3+ (0,004 %)

- **NETHERLANDS**

Not applied in 2000
Det. analysis at JRC request

- T T Buffer: 5 m (3m)
- Mean parcel size: 1,5 ha
- 576 parc. concerned (2,5%)
- 7 (0,03 %) New C3+: +0,5 %
- 32 (0,14%) New C3 - : +1,6%

-

Technical tolerances

A few results on 1 ha ceiling

- ESPANA (Tragsatec)
  - Applied in 2000
  - Detailed analysis in report
  - but complex (10 sub C3 codes)
  - To be discussed !!!

- T T Buffer: 3 m
- Mean parcel size: 2,2 ha
- on 1 site:
- 11 parc. Concerned
- 11 new C3 + (+ 0.7 %)
- on all sites:
- 5064 p. Concerned (+1.3 %)
- ? new C3 +

Technical tolerances

A few results on 1 ha ceiling

- ESPANA (Tragsatec)
  - Applied in 2000
  - Detailed analysis in report
  - but complex (10 sub C3 codes)
  - To be discussed !!!

- T T Buffer: 3 m
- Mean parcel size: 2,2 ha
- on 1 site:
- 11 parc. Concerned
- 11 new C3 + (+ 0.7 %)
- on all sites:
- 5064 p. Concerned (+1.3 %)
- ? new C3 +

- **Conclusions and recommendations**

⇨ Probably not very critical

⇨ But has to be applied everywhere in 2001

⇨ Analyses expected in Countries with large parcels + coarse buffer

⇨ To be discussed in 2001 Kick-off meetings

Technical tolerances

- **Ceiling to LPIS official value**
  - Included in JRC T. Recommendations N° 3, since 4 years.
  - More generally, integral part of Administrative controls (IACS)
    - LPIS provides a Gross, reference Area

Net cultivated area <= Gross Area

    - The reference area may have its own TT

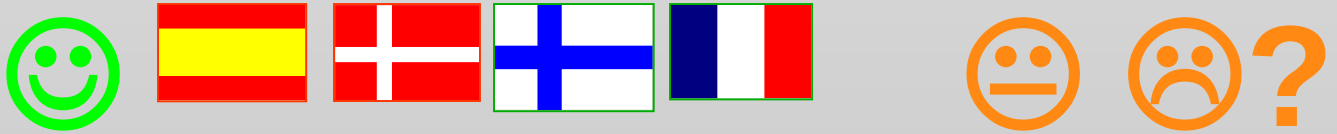
(cf foot note of Annex ref. VI/8388/94)

  - In RS.C, ceiling means that

Net accepted area <= Gross Area + Lpis T.T

Technical tolerances

- **Ceiling to LPIS official value**
  - Important because it avoid accepting un-relevant declaration, when T.T are large
    - especially when using a 5m Buffer.
  - But sometimes complex to implement
    - Ref. parcel contents several crops
    - or several farmers…
  - Nat. Administrations have to provide to contractors the corresponding file
- **Present status of implementation not so clear**



Technical tolerances

- **Other specific rules**

  - Ceiling to declared area at PARCEL level

    - No C3- codes ("under declared")
    - No compensation between parcels C3 + and C3 -.

  - NB: Ceiling to declared area / GROUP level
    - is compulsorily
    - No compensation between GROUPS.

Technical tolerances

- **A target of 5% accuracy ?**
  - Applicable in 2001
    - Indicates what the DG AGRI considers as an efficient control (area checks) …
  - A Basis to select appropriate
    - Measurement methods
    - Remote sensing data // Technical tolerances.
  - JRC recommended tests and calculation in 2000
  - But no results identified in the present reports !

Technical tolerances

- **A target of 5% accuracy ?**
  - **Further explanations**
    - **This target has to be achieved on 5% of the area**

(I.e. not of the parcels)

Site LOND, United Kingdom

Buffer (m)	Target of Relative accuracy	Parcels		Area	
		Number	%	Ha	%
2m Orthophotos	Better than 5%	1835	56.9	17954.2	88.6
	Better than 10%	2732	84.7	19940.1	98.4
	Better than 15%	2973	92.2	20163.0	99.5
6m SPOT P	Better than 5%	29	0.9	1134.8	5.6
	Better than 10%	948	29.4	13111.0	64.7
	Better than 15%	1835	56.9	17954.2	88.6

Calculation by JRC on 99 data (Stresa conf)

Technical tolerances

- **A target of 5% accuracy ?**
  - **Further explanations**
    - **This target has to be achieved on 5% of the area**

(I.e. not of the parcels)

Site LOND, United Kingdom

Buffer (m)	Target of Relative accuracy	Parcels		Area	
		Number	%	Ha	%
2m Orthophotos	Better than 5%	1835	56.9	17954.2	88.6
	Better than 10%	2732	84.7	19940.1	98.4
	Better than 15%	2973	92.2	20163.0	99.5
6m SPOT P	Better than 5%	29	0.9	1134.8	5.6
	Better than 10%	948	29.4	13111.0	64.7
	Better than 15%	1835	56.9	17954.2	88.6

Calculation by JRC on 99 data (Stresa conf)

Technical tolerances

- A target of 5% accuracy ?
  - Further explanation
    - This target has to be achieved on 5% of the area, at the level of control region …

      Not a RS control site (definition?)

      Include both RSC and traditional inspection

      and for the dossiers (parcels) controlled in these regions:

      (not for all the dossiers & parcels of the region!)

Technical tolerances

- **A target of 5% accuracy ?**
  - **Further explanation**
    - This target has to be achieved on 50% of the area, at the level of control region …

      Not a RS control site (definition?)

      Include both RSC and traditional inspection

      and for the dossiers (parcels) controlled in these regions:

      (not for all the dossiers & parcels of the region!)
  - **Possible strategies?**
    - a criteria for risk analysis (selection of the sample)?

      Not very applicable for RSC (cluster sample)
    - New ceiling for small parcels (extend T3)?

      Not very efficient ...

Technical tolerances

- **A target of 5% accuracy ?**
  - We expect further analysis made by Contractors or Administrations
  - To define technical choices for 2001 campaign
  - A point of discussion in the 2001 Kick off meeting

Space Applications Institute

MARS Projet

Review of 2000's Campaign

- Improvements in the methodologies
- Technical Tolerances
- Controls of durum Wheat?
- Controls of Reference Year ?

Control of Durum Wheat ?

Space Applications Institute

MARS Projet

Why this topic ?

- ⇨ Durum wheat not fully checked by Remote sensing
- ⇨ Base of high payments

  (>> soft Wheat)
- ⇨ The general rule

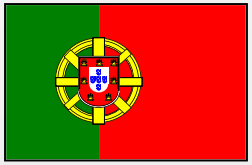
  A category of feature should not have a zero probability to be checked
- ⇨ Different strategies between M States

Durum Wheat in R.S. Controls

- **Systematic parallel Rapid Field Visit on 100% of the parcel declared in Durum Wheat**

Control of Durum Wheat ?

Durum Wheat in R.S. Controls



- Systematic parallel Rapid Field Visit on 100% of the parcel declared in Durum Wheat

- Andalusia Systematic Rapid Field Visit
- Rest of SPAIN : Normal RFV visit after CAPI; dossiers rejected + sample of accepted DW (10%)

Control of Durum Wheat ?

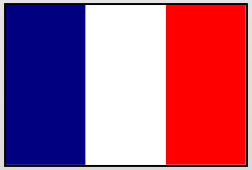
Space Applications Institute

MARS Projet

Durum Wheat in R.S. Controls

- Systematic parallel Rapid Field Visit on 100% of the parcel declared in Durum Wheat

- Andalusia Systematic Rapid Field Visit
- Rest of SPAIN : Normal RFV visit after CAPI; dossiers rejected + sample of accepted DW (10%)



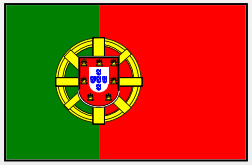
- Apparently nothing specific (Dossier/ Group rejected + random of accepted (1 -2% ?)

Control of Durum Wheat ?

Space Applications Institute

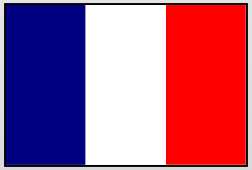
MARS Projet

Durum Wheat in R.S. Controls



- Systematic parallel Rapid Field Visit on 100% of the parcel declared in Durum Wheat

- Andalusia Systematic Rapid Field Visit
- Rest of SPAIN : Normal RFV visit after CAPI; dossiers rejected + sample of accepted DW (10%)



- Apparently nothing specific (Dossier/ Group rejected + random of accepted (1 -2% ?)

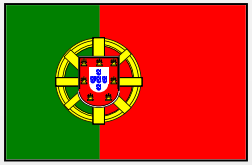
- Most of ITALY (aero) Systematic field visit

Control of Durum Wheat ?

Space Applications Institute

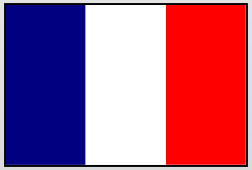
MARS Projet

Durum Wheat in R.S. Controls



- Systematic parallel Rapid Field Visit on 100% of the parcel declared in Durum Wheat

- Andalusia Systematic Rapid Field Visit
- Rest of SPAIN : Normal RFV visit after CAPI; dossiers rejected + sample of accepted DW (10%)



- Apparently nothing specific (Dossier/ Group rejected + random of accepted (1 -2% ?)

- Most of ITALY (aero) Systematic field visit

- Apparently nothing specific
- (Dossier/ Group rejected)

Space Applications Institute

Review of 2000's Campaign

- Improvements in the methodologies
- Technical Tolerances
- Controls of durum Wheat?
- Controls of Reference Year ?

Control of Reference Years ?

- Two type of controls

  ⇨ Eligibility of Arable land

  ⇨ Eligibility of Set aside

Control of Reference Years ?

- **Two type of controls**

  ⇨ **Eligibility of Arable land**
  - Check than non permanent land in 91
  - Reject if no trace of cultivation between 86/91

  ⇨ **Eligibility of Set aside**
  - Check arable land / Year n-1

Control of Reference Years ?

- **Two type of controls**

  ⇨ **Eligibility of Arable land**
  - Check than non permanent land in 91
  - Reject if no trace of cultivation between 86/91

  ⇨ **Eligibility of Set aside**
  - Check arable land / Year n-1

  ⇨ **Mainly a northern Europe concern**

Control of Reference Years ?

- **Historical development**

	Member States				Sites			Sites			
	Arable Land Eligibility (86-91)							Set aside Eligibility (n-1)			
	94	95	96	97	98	99	2000	97	98	99	2000
Be	0	x	0	0	1	0	0		0	0	0
DK	0	x	X	X	1	1	1		0	0	0
D	0	(x)	0	x	0	0	0		0	0	0
Esp	0	(x)	(x)	0	0	0	0		0	0	0
Fr	0	(x)	0	x	0	1	0		0	0	0
Fin	na	x	0	x	1	1	1		0	0	0
Gr	0	x	x	x	1	1	1		0	0	0
Irl	0	x	X	X	1	1	1		0	0	0
Ita	0	0	0	0	0	0	0		0	0	0
NL	0	x	x	X	4	4	4		0	0	0
Ost	na	na	na	na	0	0	na	na	0	0	na
P	0	0	0	0	0	0	0		0	0	0
Sw	na	(x)	0	na	na	0	0	na	na	0	0
UK	x	X	X	X	3	3	3		3	3	2
Total					12	12	11		3	3	2
% Sites					12%	11%	10%		3%	3%	2%
% S.M	9%	15%	23%	33%	54%	50%	46%		8%	7%	8%

Control of Reference Years ?

Space Applications Institute

MARS Projet

- **Historical development**

	Member States				Sites			Sites			
	Arable Land Eligibility (86-91)							Set aside Eligibility (n-1)			
	94	95	96	97	98	99	2000	97	98	99	2000
Be	0	x	0	0	1	0	0		0	0	0
DK	0	x	X	X	1	1	1		0	0	0
D	0	(x)	0	x	0	0	0		0	0	0
Esp	0	(x)	(x)	0	0	0	0		0	0	0
Fr	0	(x)	0	x	0	1	0		0	0	0
Fin	na	x	0	x	1	1	1		0	0	0
Gr	0	x	x	x	1	1	1		0	0	0
Irl	0	x	X	X	1	1	1		0	0	0
Ita	0	0	0	0	0	0	0		0	0	0
NL	0	x	x	X	4	4	4		0	0	0
Ost	na	na	na	na	0	0	na	na	0	0	na
P	0	0	0	0	0	0	0		0	0	0
Sw	na	(x)	0	na	na	0	0	na	na	0	0
UK	x	X	X	X	3	3	3		3	3	2
Total					12	12	11		3	3	2
% Sites					12%	11%	10%		3%	3%	2%
% S.M	9%	15%	23%	33%	54%	50%	46%		8%	7%	8%

Control of Reference Years ?

Space Applications Institute

MARS Projet

- **Historical development**

	Member States				Sites			Sites			
	Arable Land Eligibility (86-91)							Set aside Eligibility (n-1)			
	94	95	96	97	98	99	2000	97	98	99	2000
Be	0	x	0	0	1	0	0		0	0	0
DK	0	x	X	X	1	1	1		0	0	0
D	0	(x)	0	x	0	0	0		0	0	0
Esp	0	(x)	(x)	0	0	0	0		0	0	0
Fr	0	(x)	0	x	0	1	0		0	0	0
Fin	na	x	0	x	1	1	1		0	0	0
Gr	0	x	x	x	1	1	1		0	0	0
Irl	0	x	X	X	1	1	1		0	0	0
Ita	0	0	Eligibility LPIS / photo			0	0		0	0	0
NL	0	x	x	X	4	4	4		0	0	0
Ost	na	na	na	na	0	0	na	na	0	0	na
P	0	0	0	0	0	0	0		0	0	0
Sw	na	(x)	0	na	na	0	0	na	na	0	0
UK	x	X	X	X	3	3	3		3	3	2
Total					12	12	11		3	3	2
% Sites					12%	11%	10%		3%	3%	2%
% S.M	9%	15%	23%	33%	54%	50%	46%		8%	7%	8%

Control of Reference Years ?

- **Recent Results and positions**

• After a long practise of reference Year Controls, MAF announced its intention to stop in 2001 ...

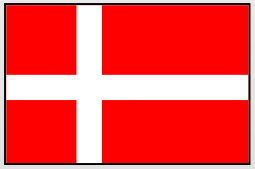
Control of Reference Years ?

Space Applications Institute

MARS Projet

- **Recent Results and positions**

- After a long practise of reference Year Controls, MAF announced its intention to stop in 2001 ...



- over 300 dossiers covered by the 12 images, 7 only were “rejected” (2.3%) against 20/25 last years

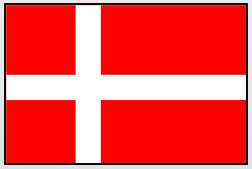
Control of Reference Years ?

Space Applications Institute

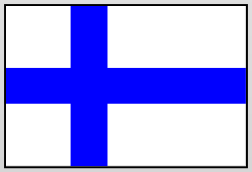
MARS Projet

- **Recent Results and positions**

- After a long practise of reference Year Controls, MAF announced its intention to stop in 2001 ...



- over 300 dossiers covered by the 12 images, 7 only were “rejected” (2.3) against 20/25 last years



- over 609 dossiers controlled for ref year in 2000, 19 only were “rejected” (3%)

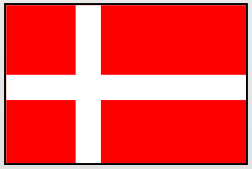
Control of Reference Years ?

Space Applications Institute

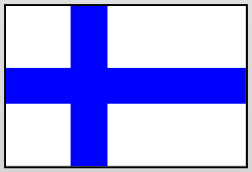
MARS Projet

- **Recent Results and positions**

• After a long practise of reference Year Controls, MAF announced its intention to stop in 2001 ...



• over 300 dossiers covered by the 12 images, 7 only were "rejected" (2.3) against 20/25 last years



• over 609 dossiers controlled for ref year in 2000, 19 only were "rejected" (3%)

• 580 dossiers rejected on 2881 in 2000, I.e 20%, with a total disputed are of 1500 ha...

•Contractor indicates increase of detected problem in some regions … "loss of memory" of the farmer thus relevant checking

Sélection des zones et choix des données de contrôle

I- Evolution du contrôle par télédétection en France

II- Méthodologie de sélection des zones

III- Choix des images adaptées au parcellaire

Rappels relatifs au SIGC

Les déclarations de culture

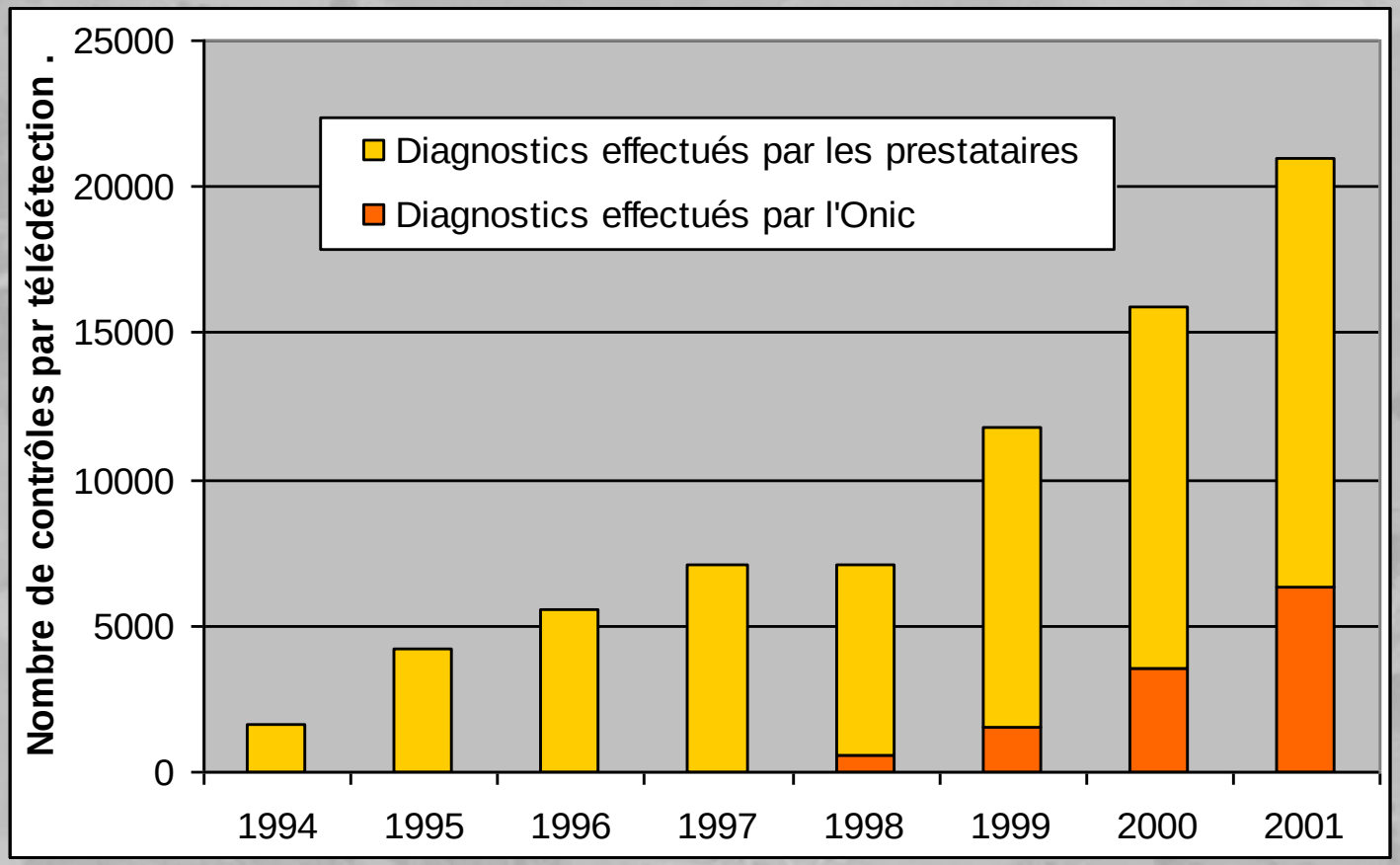
- 440 000 déclarations de surface en 2000
- 13 000 000 ha en céréales, oléagineux protéagineux et gel
- 11 500 000 ha en fourrage
- 2 000 000 ha en autres utilisations

Les contrôles

- 29 000 contrôles sur place par an
- 6,7% des déclarations

Evolution du contrôle par télédétection en France

une augmentation progressive



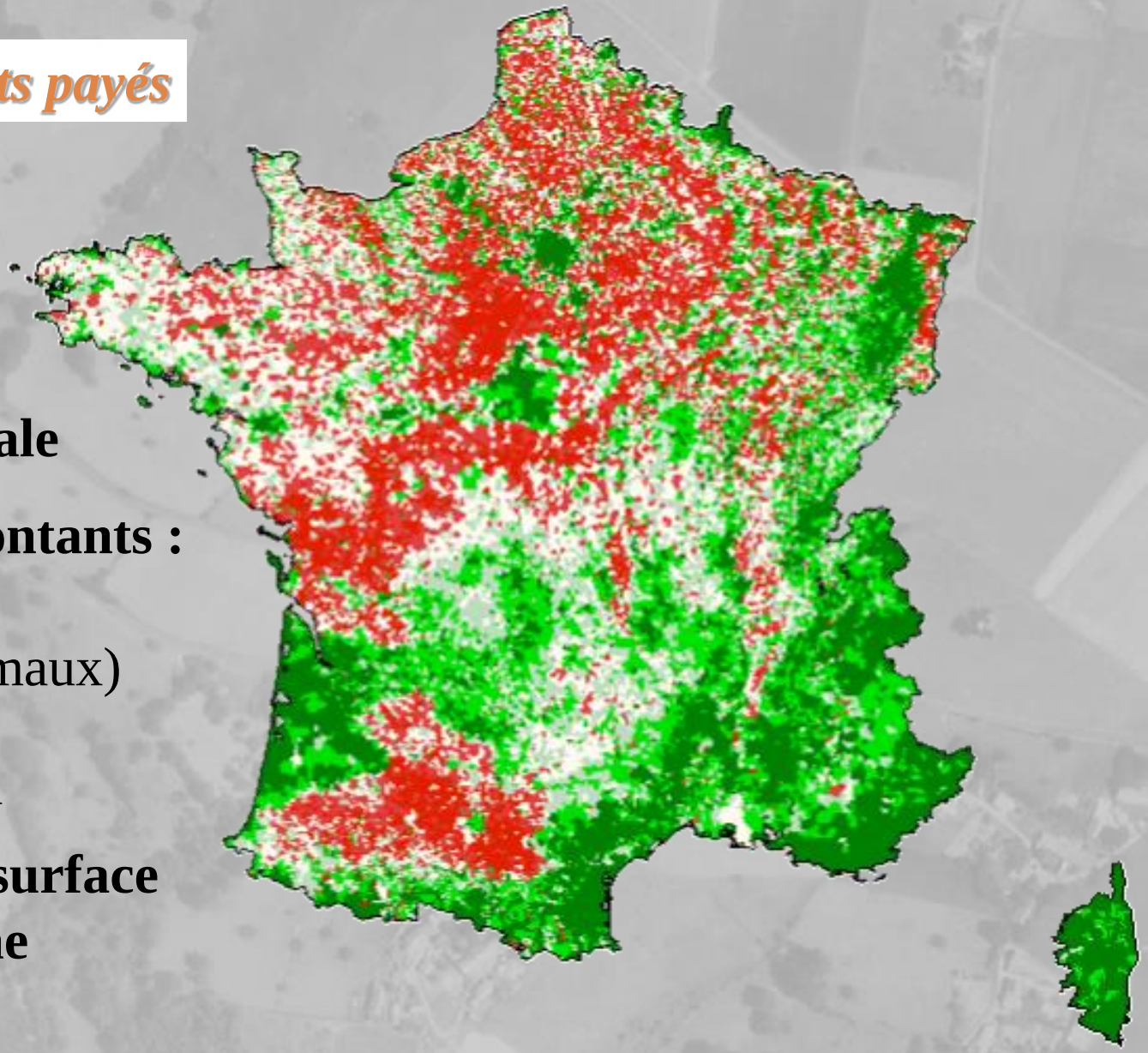
Méthodologie de sélection des zones

1- Carte des montants payés

2- Carte d'analyse de risque

3- Sélection des zones

Carte des montants payés



- **Base communale**
- **Somme des montants :**
  - COPG
  - Fourrage (animaux)
  - Pmsee, ichn, extensification
- **Divisée par la surface de la commune**

Carte d'analyse de risque – Etape 1

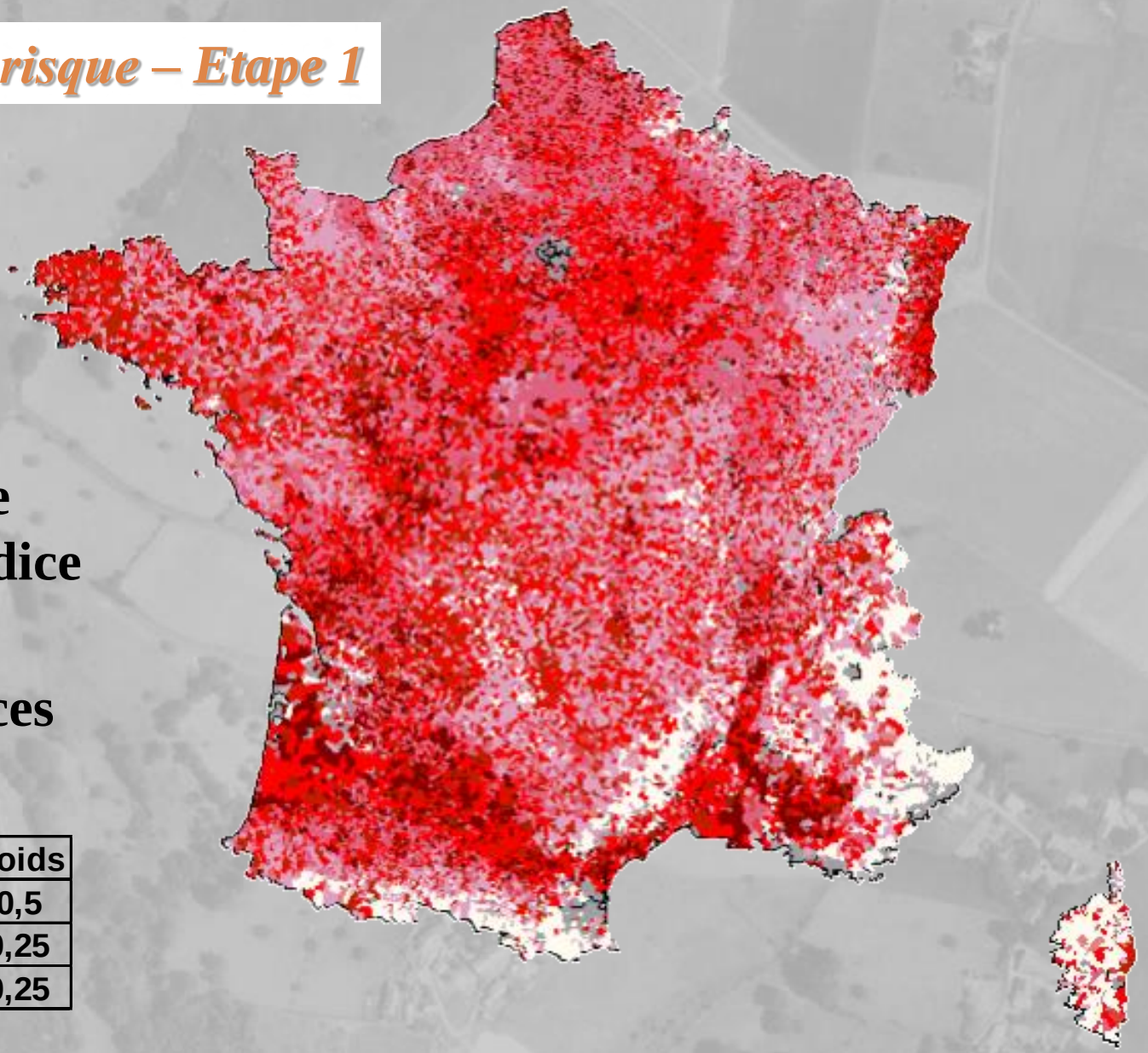
- 3 critères :

Montants payés
Surfaces en anomalie
Pénalités appliquées

- 4 classes de taille équivalente: Indice

- Somme des indices pondérés :

Critères	Poids
Montants payés	0,5
Surfaces en anomalie	0,25
Pénalités appliquées	0,25



Carte d'analyse de risque – Etape 2

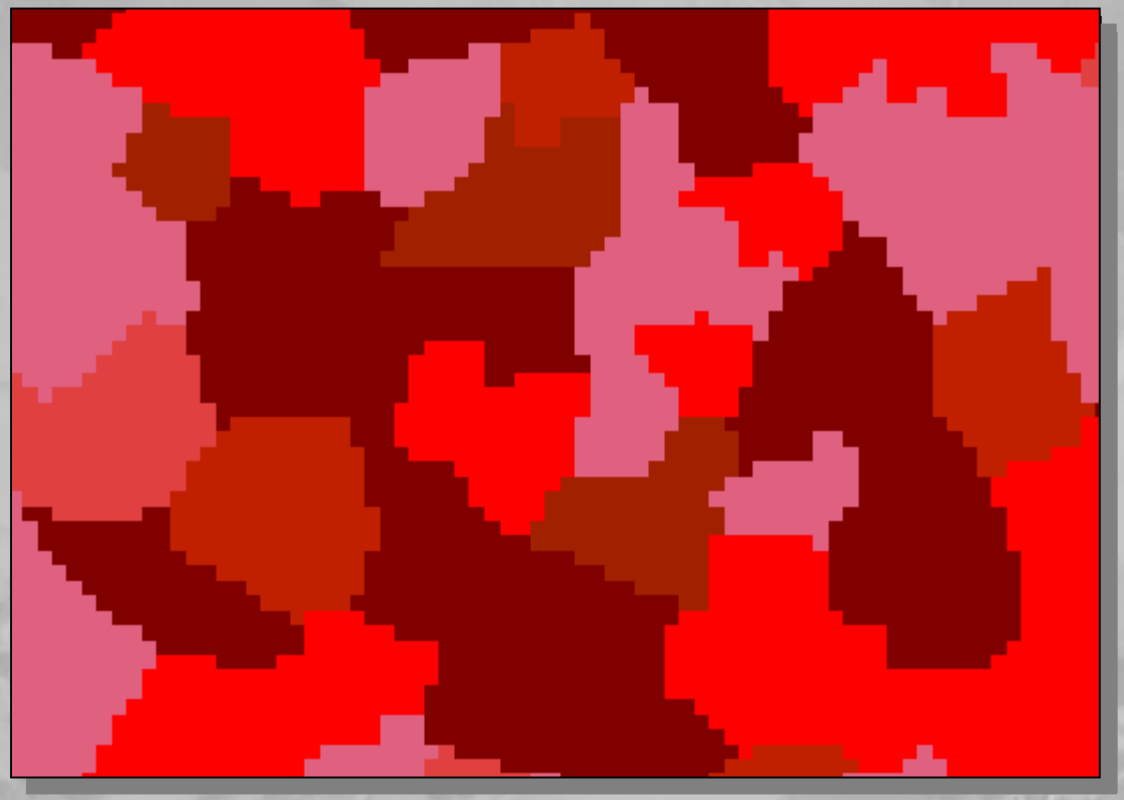
Question : Quel est le risque moyen dans un rayon de 25 km, en tout point du territoire ?

Changement de format

Format vecteur (commune)

↓

Format grille (raster)



Taille de la cellule

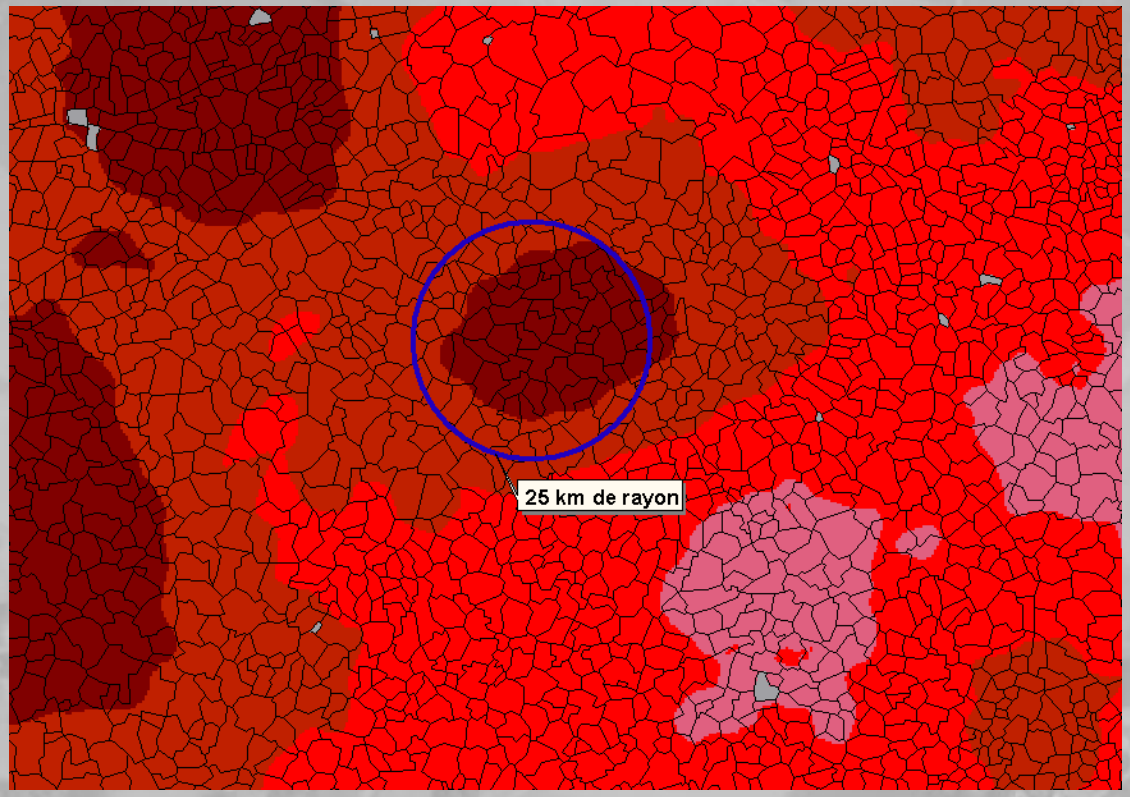
0,5 km x 0,5 km = 0,25 km²

Carte d'analyse de risque – Etape 3

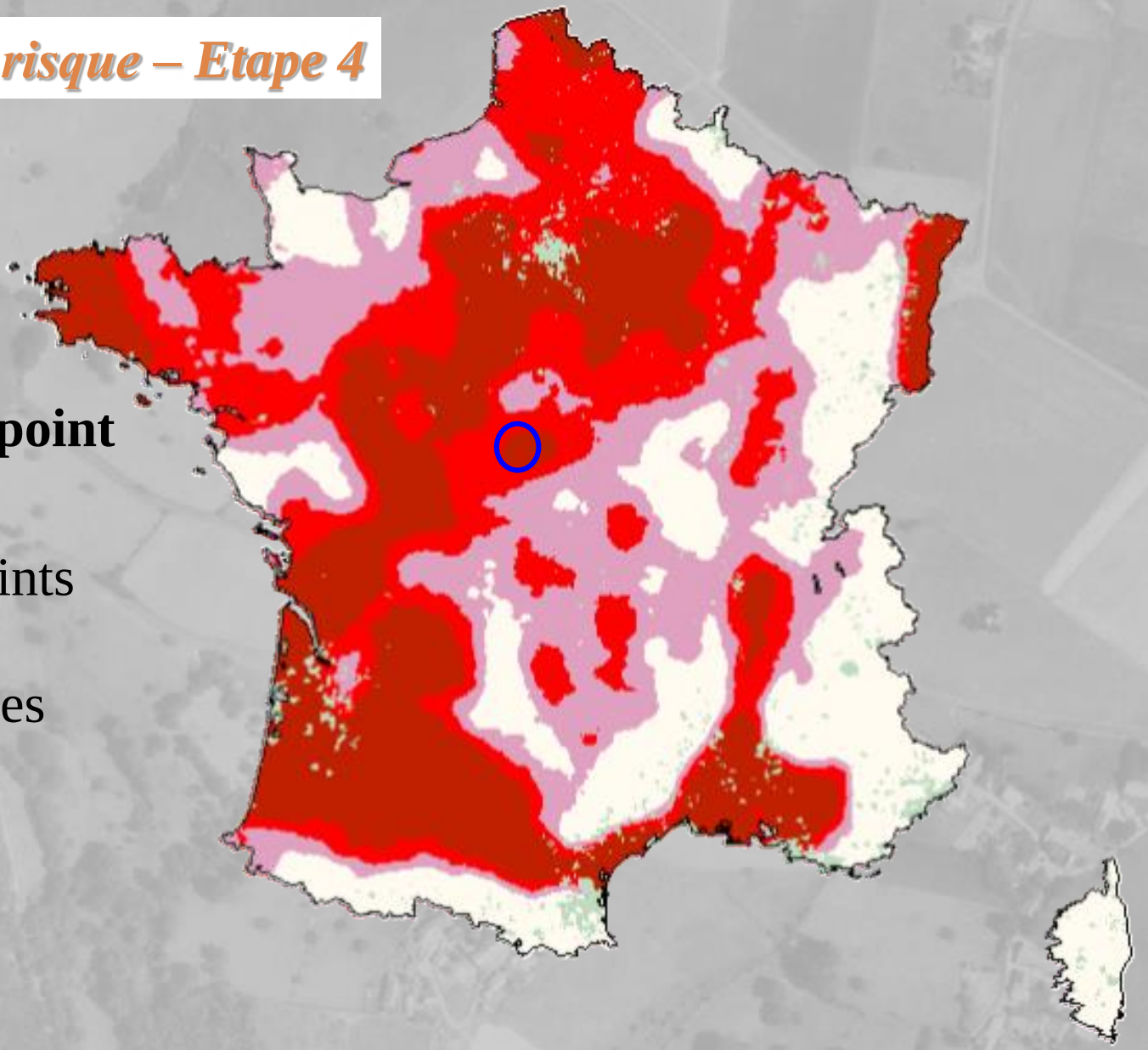
Question : Quel est le risque moyen dans un rayon de 25 km, en tout point du territoire ?

Analyse de voisinage

- Fonction focale
- A chaque cellule est associée la moyenne des risques des cellules situées dans un cercle de 25 km de rayon



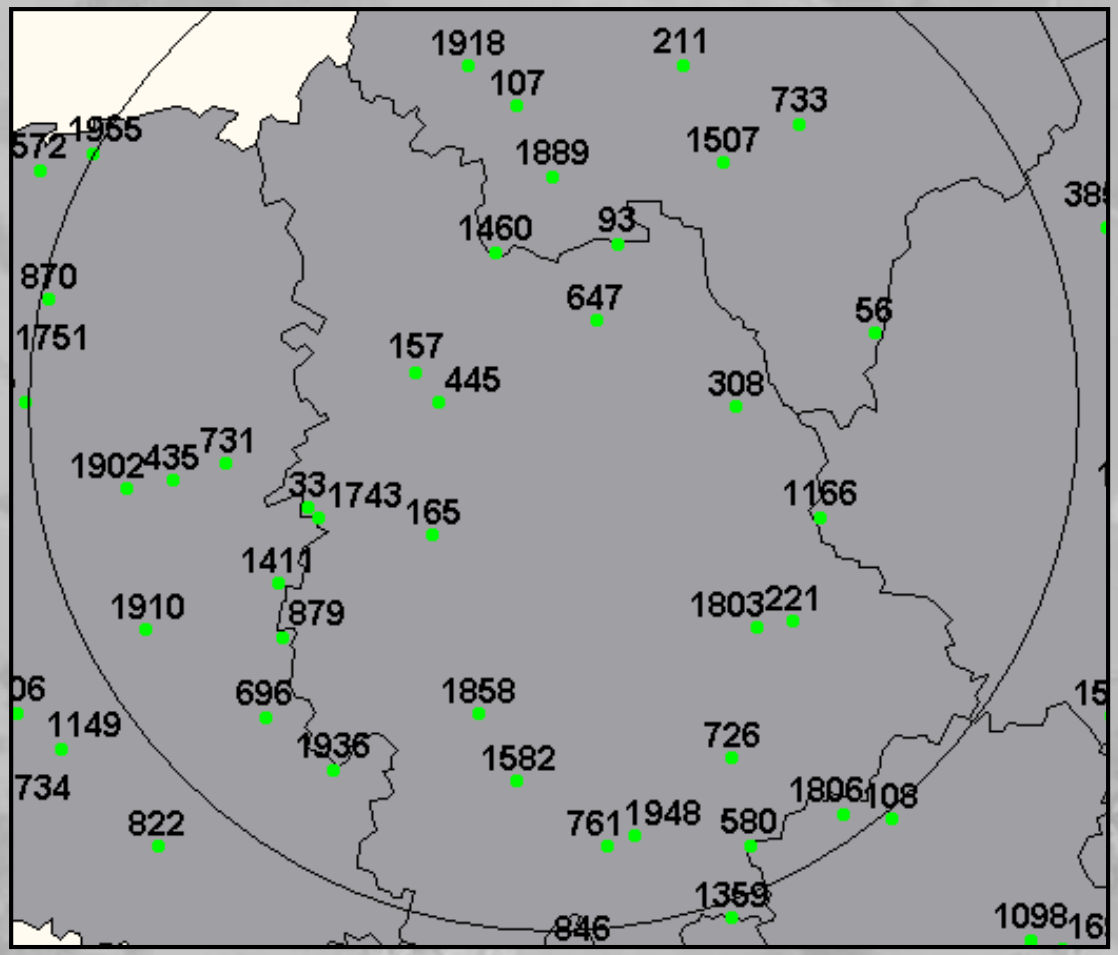
Carte d'analyse de risque – Etape 4



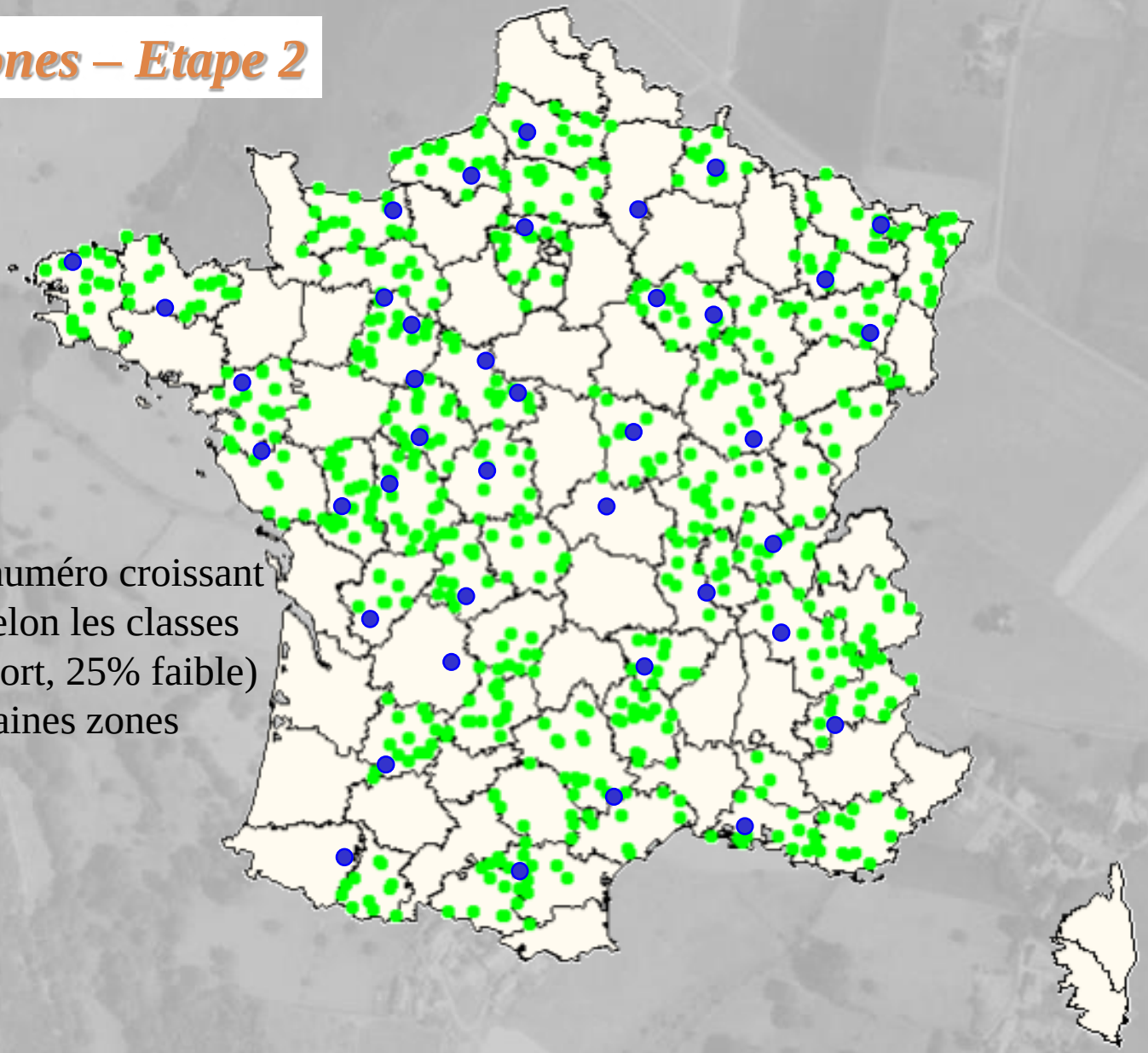
- **Analyse en tout point de la carte**
  - 2 millions de points
  - 4 classes de tailles équivalentes

Sélection des zones – Etape 1

- **Tirage de points au hasard**
  - Logiciel SAS
  - Numérotés 1à 2000



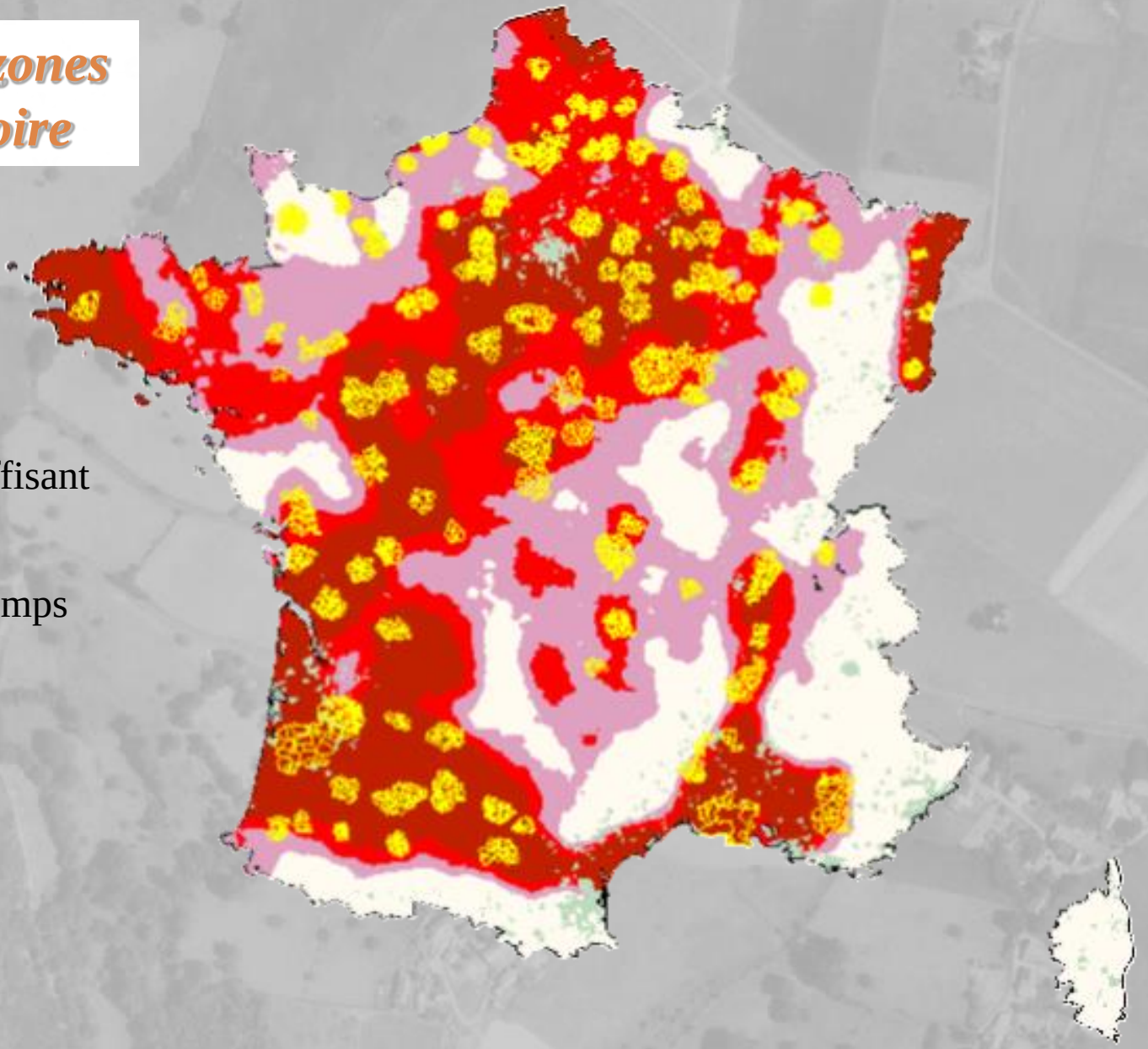
Sélection des zones – Etape 2



Choix des zones à contrôler

- Analyse des zones par numéro croissant
- Répartition des zones selon les classes de risque (75 % risque fort, 25% faible)
- Choix orienté pour certaines zones

Répartition des zones tout sur le territoire



- Zone en nombre suffisant

- Réparties dans le temps et sur le territoire

Sélection des zones de contrôle par télédétection : conclusion

- Dans les premières années, le choix des zones a été effectué par « expertise »

- Puis ce choix a été réalisé à l'aide d'une carte des paiements.

- Depuis 2 ans, il s'appuie sur une carte d'analyse de risque, complétée cette année par un tirage au hasard des coordonnées des sites, ce qui permet de formaliser le processus de sélection.

Choix des images adaptées au parcellaire

1- Objectif

2- Cartographie

3- Choix des images

Choix des images adaptées au parcellaire

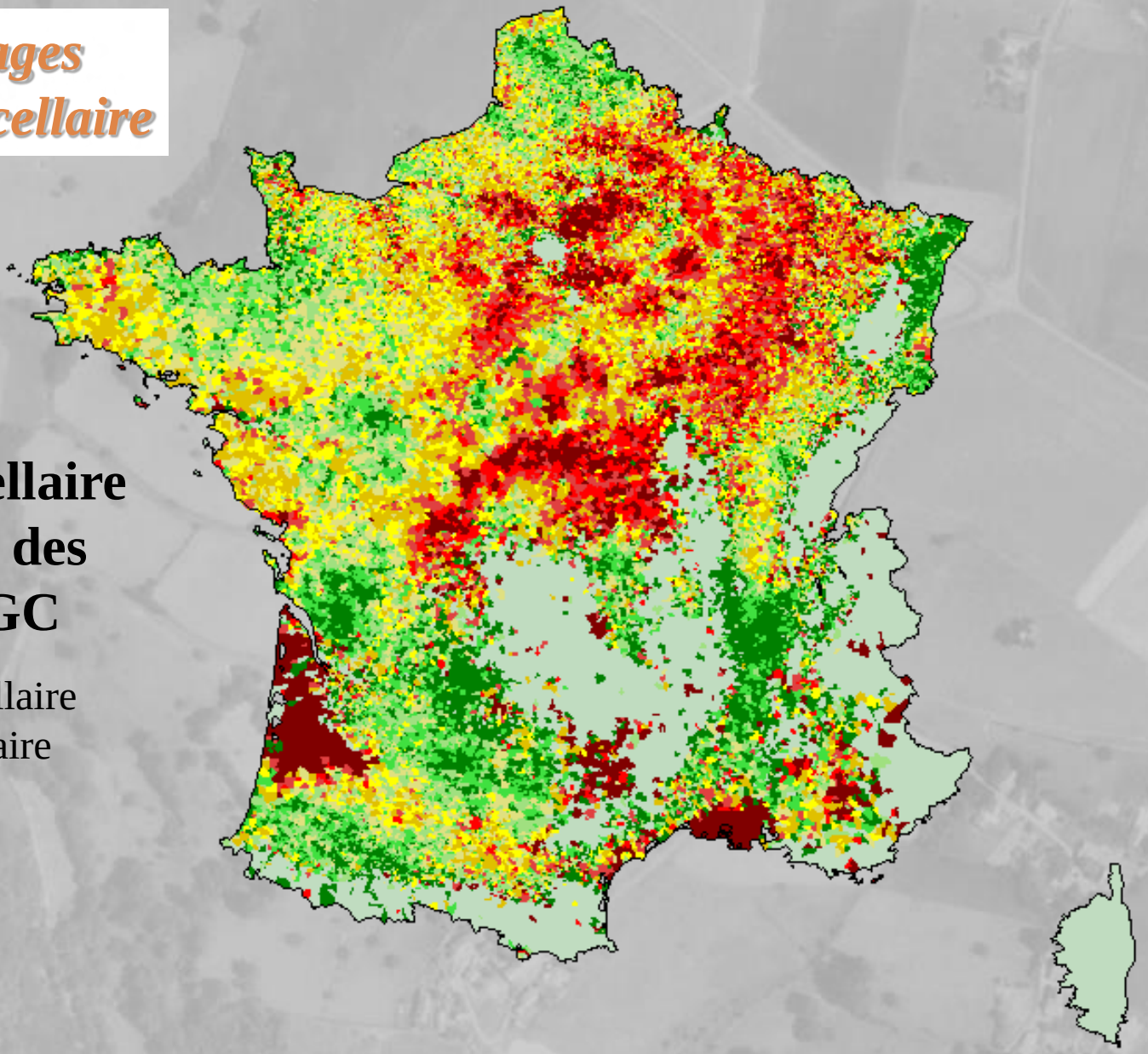
Objectif : **Répondre aux recommandations de la Commission Européenne en matière de mesurage des surfaces agricoles (rev 6)**

Rappel **: Système déclaratif cadastral et par îlot**

Contraintes **:**

- **Le choix des images doit être adapté à la taille du parcellaire**
- **50 % des surfaces au moins doivent être mesurées avec une incertitude de 5 % au plus**

Choix des images adaptées au parcellaire

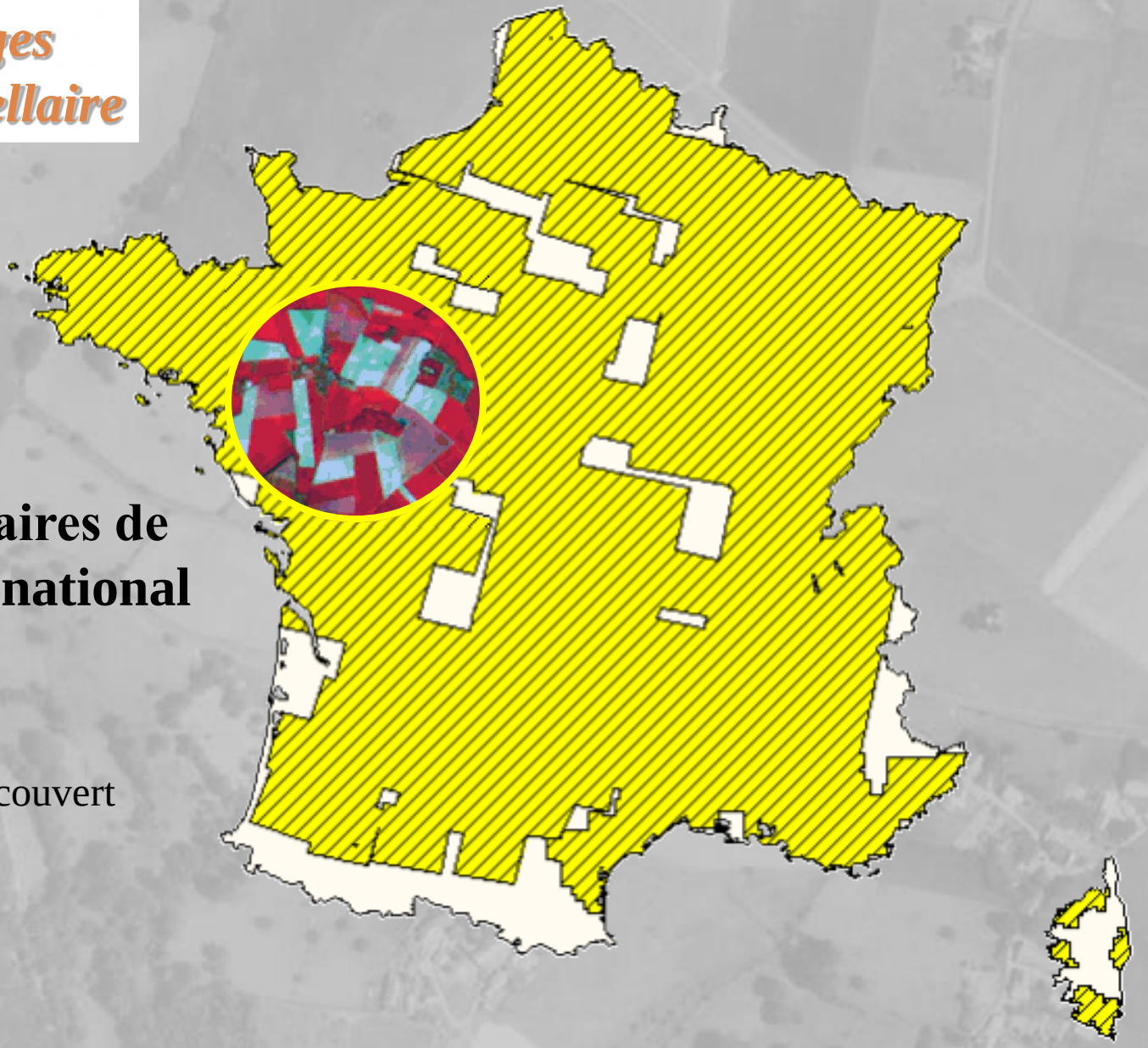


1- Carte du parcellaire établie à partir des données du SIGC

- du rouge : grand parcellaire
  au vert : petit parcellaire

Choix des images adaptées au parcellaire

2- Cartographie d'images satellitaires de tout le territoire national



Territoire couvert

Choix des images en fonction des sites

3- Résultats : évaluation pour chacun des sites

- estimation de la taille du parcellaire par comparaison avec les sites déjà contrôlés
- appréciation du type de paysage

Répartition des zones ***(taille décroissante des parcelles)*****:**

- **images spot/landsat seules** ***(5 à 10% des zones)***
- **images spot/landsat associées à des orthophotos d'archive** ***(80 à 90% des zones)***
- **photographie aériennes de l'année ou Ikonos** ***(5 à 10% des zones)***

Conclusion

- **Dans les premières années : série d'images à 10, 20 ou 30 mètres (test de l'image radar, de l'orthophoto d'archive ou « de l'année »)**

- **Aujourd'hui : extension « raisonnée » de l'usage des orthophotos d'archive (contrainte coût/efficacité), et maintien de zones contrôlées avec une orthophoto « de l'année »**

- **Demain : Image très haute résolution (offre ?)**

Land eligibility reference checks

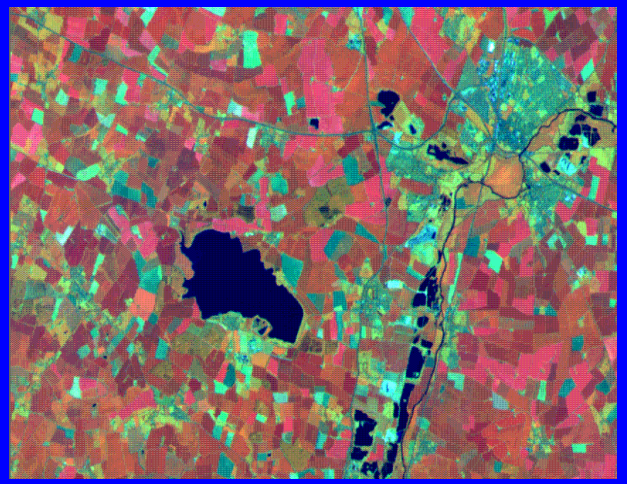
UK position

Brian Bibby - CAP Schemes Management Division,
Ministry of Agriculture Fisheries and Food, London

6th Conference on control with remote sensing of area based subsidies-Dublin November 2000

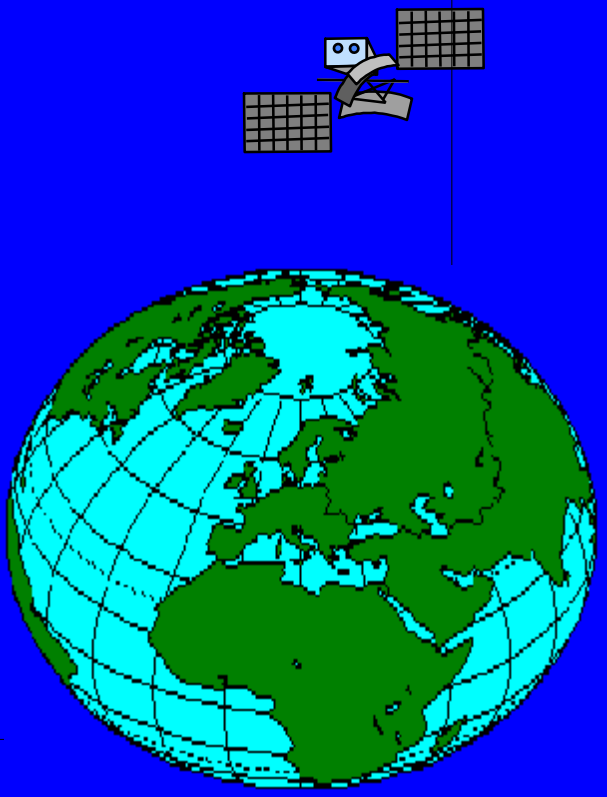
Land eligibility reference checks

- UK carried out these checks as part of the remote sensing programme between 1993 and 1999.
- archive imagery from 1986-1991was used during this period to check that land claimed under AAPS was not in permanent grass, permanent crops, non-agricultural use or woodland on 31 December 1991.



Purpose of these checks

- deterrent
- anti fraud measure
- only practicable means of conducting random historical checks



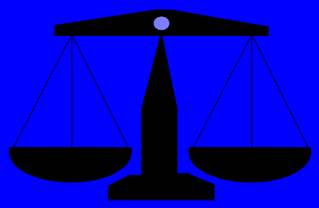
Review of policy

- IACS and Inspections Working Group
  - queried value and fairness of such checks (1999)

- MAFF response: undertook to review the use of remote sensing for checking land eligibility.

Outcome of the review

- deterrent value is now questionable
- remote sensing does not give clear results in all cases
- problems for farmer in contesting remote sensing findings



Outcome of the review (continued)

- massive penalties can be incurred

- legal uncertainties
- disproportionate effort

In conclusion……..

- use of remote sensing to carry out land eligibility reference checks has by now served its purpose
- majority of AAPS claimants in England will have been subject to checks
- neither necessary, nor proportionate to continue them

In conclusion……..

- in some cases, also unfair, especially where a farm has changed ownership

- Land eligibility reference checks are therefore being dropped from our remote sensing programme

Space Applications Institute

http://mars.aris.sai.jrc.it/control/

6th Conference on Control with Remote Sensing of Area-based Subsidies

Jurys Conference Hotel, Dublin, Ireland
16, 17 November 2000

Session 3: Use of IKONOS Data

Lia Karamali

European Commission DG JRC - SAI
MARS Sector - Control with Remote Sensing of Area-based Subsidies
I-21020 Ispra (VA), Italy
Tel.: +39 0332 78 6337 - Fax: +39 0332 78 6369
Email: lia.karamali@jrc.it
http://mars.aris.sai.jrc.it/control/

Introduction

- Session Presentations
- Organisation of Testing Campaign
- Objectives of Testing Campaign
- SIE Coverage and Control Sites
- Overview of Imagery Ordered
- Accepted Test Proposals
- Highlights of Test Results
- Conclusions

Session Presentations

- **Overview of the RSC2000 Pilot Evaluation Tests**
  Lia Karamali - EC DG JRC SAI
- **Ortho-correction and comparison to ortho-photos**
  Thomas Kukuk - GAF (D)
- **Ortho-rectification of IKONOS CARTERRA Geo-images**
  Lefteris Tournas - ERATOSTHENES (GR)
- **Multitemporal Ikonos Data: Results from Classification and Interpretation of some Segments (Areas) in Reggio Emilia Province, Italy**
  Stefano Lorenzini - ITA (I)
- **Control of Area-based Subsidies in scattered sites: Use of IKONOS imagery vs. Aerial Photography - a First Approach**
  José-Luis Tirado Valencia - DAP (E)
- **IKONOS and Agri-Environmental Measures (AEMs) - Preliminary Results from two Ongoing Pilot Studies in Italy and England**
  N. Watson - FRCA (UK), Pär-Johan Åstrand - EC DG JRC SAI
- **Status Overview of Space Imaging Europe Activities and IKONOS Data Supply**
  Liana Varela - Space Imaging Europe

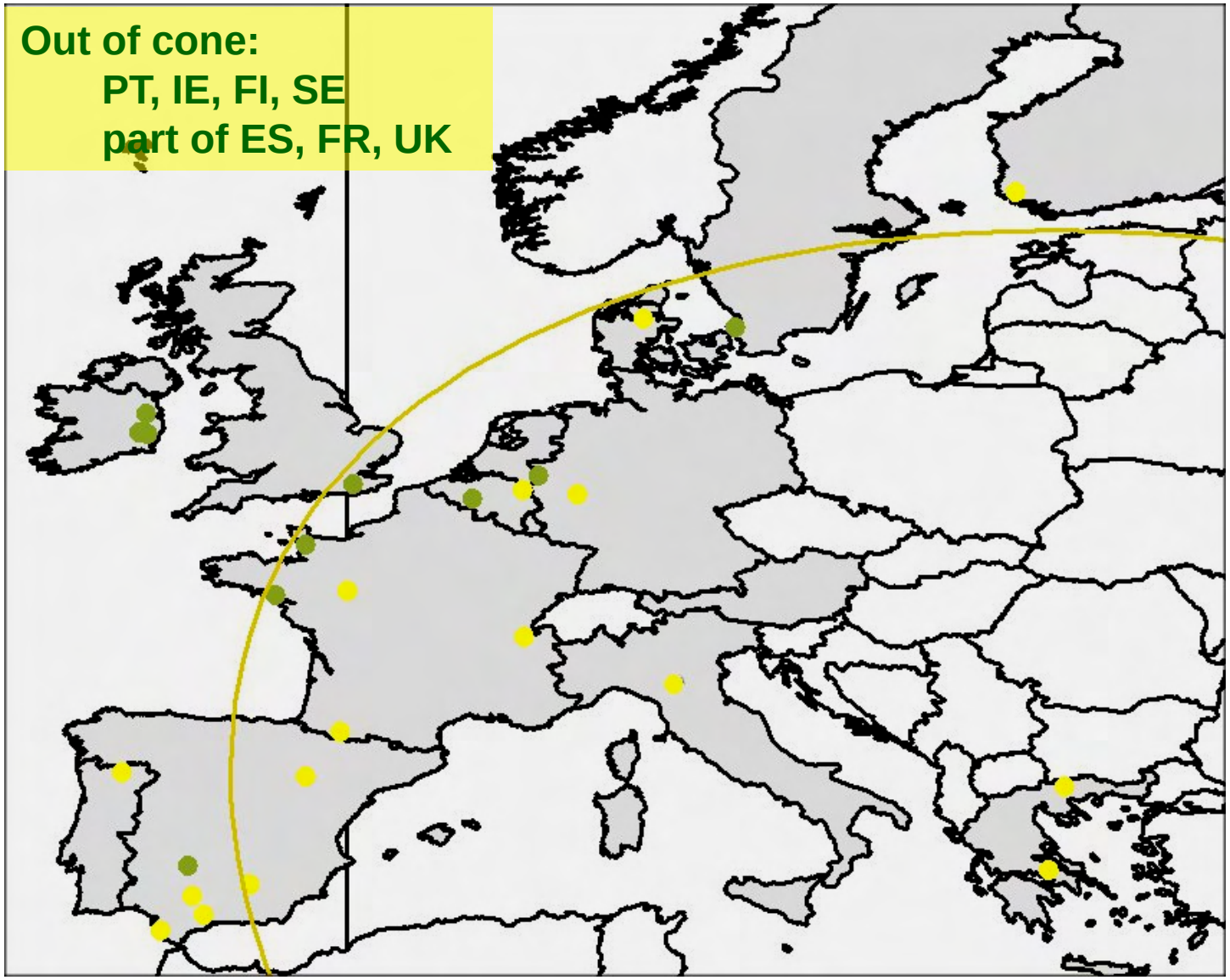
Organisation of Testing Campaign

- **EC DG JRC SAI - MARS Control Team**
  - ⇨ Image acquisition co-ordination: Guido Peroni
- **Space Imaging Europe**
  - ⇨ Image Orders: Yanna Sachami
- **Proposals accepted for 13 Member States, 17 contractors**
  - ⇨ BE, DE-EFTAS, DE-GAF, DK, ES-DAP, ES-TRAGSATEC, FI, FR-SCOT, FR-SIRS, GR-ELPHO, GR-ERATOSTHENES, IE IT, NL, PT-GEOMETRAL, SE, UK
- **Out of cone**
  - ⇨ PT, IE, FI, SE, part of ES, FR, UK
- **Total images acquired**
  - ⇨ 17
- **Imagery not acquired**
  - ⇨ 5 Member States: BE, IE, DE (EFTAS), SE, UK
  - ⇨ a total of 10 images out of 27 not acquired (success rate 63% out of 98% for RSC2000)

Objectives of Testing Campaign

- Verify the **information content** of VHR imagery (Pan, Multispectral, Pan-Sharpened) for Control purposes
- Assess the **IKONOS system** for acquiring data on different topographic, meteorological (and political) conditions and various AOI shapes (i.e.: mosaicing)
- European Zones situated **outside Athens' Direct Reception Cone:** assess handling and delays involved with data recorded on board
- SIE actual capabilities in **planning, acquiring, producing and delivering** data in so timely-critical conditions as required by RSC
- Possible contractors **constraints** in integrating new data within their current systems
- Promote suggestions/discussions about implementing **new strategies** for the Control Programme

Approximate Site Location

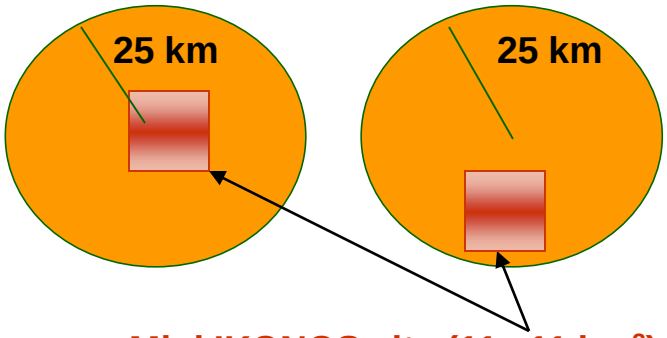


Testing Campaign Control Site Types

Space Applications Institute

http://mars.ariis.sai.jrc.it/control/

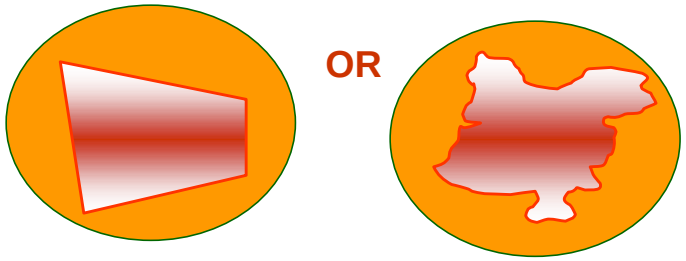
Mini



Mini IKONOS site (11x 11 km²)

Full

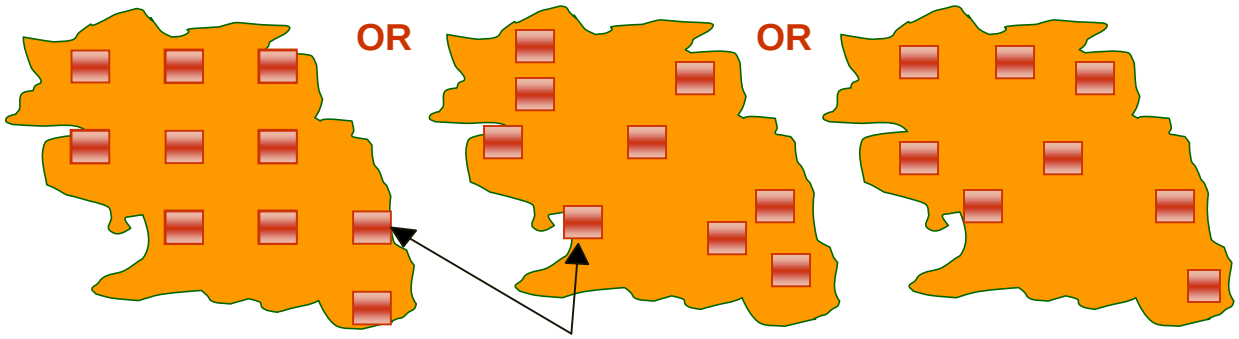
FR, PT, IT



Full IKONOS site (<1000 km²)

Scattered

ES



Mini IKONOS site (11x 11 km²)

Summary of Imagery Ordered

• DE-GAF	1KS (217.33 km²)
• DK-DIAS	1 KP (186.73 km²)
• ES-DAP	4 KP (c.121 km² per site)
• ES-TRAGSATEC	1 KX (119.77 km²)
• FI-NLS	1 KP (120.71 km²)
• FR-SCOT	1 KS (910.52 km²)
• FR-SIRS	2 KS (239.14, 459.49 km²)
• GR-ELPHO	1 KS (118.87 km²)
• GR-ERATOSTHENES	1KP (119.4 km²)
• IT-CCIA	2 KX (496.72, 487.15 km²)
• NL-GEORAS	1 KP (197.91 km²)
• PT-GEOMETRAL	1 KP (962.28 km²)

NB. KS= Pan-sharpened, KP=Panchromatic, KX=Multispectral

Test Proposals (1)

- **BE-CTS** (image not acquired)
  - ⇨ **mini-site pan-sharpened mode**
    - ❑ different parcel sizes present
    - ❑ part of university project on integration of SAR and optical imagery for automatic classification
  - ⇨ **proposal objective to identify the best data source for automatic classification**
  - ⇨ **method**
    - ❑ ortho-rectification
    - ❑ new automatic classification method based on neural systems to be tested
    - ❑ all possible band combinations of both optical and radar data to be tested including classification accuracy results
    - ❑ a threshold regarding the parcel size spatial resolution needs ratio to be identified
- **DE-GAF (1KS - 217.33 km2)**
  - ⇨ **site dominated by forage areas**
  - ⇨ **mostly small field and plot sizes occur (parcel size=0,3ha)**
  - ⇨ **tests to be made on parcel size measurement and crop identification**
  - ⇨ **comparison with ortho-photo archive**
- **DE-EFTAS** (image not acquired)
  - ⇨ **mini-site pan-sharpened mode**

Test Proposals (2)

- **DK-DIAS (1 KP - 186.73 km2)**
  - since 1997 colour orthophotos used as digitising background (1995, outdated: according to a pilot study by the Plant Directorate 20% of all field boundaries change from one year to another)
  - IKONOS PAN imagery to be used as backdrop images in the digitisation process; expected to minimise the need for ground truth data
  - correction of IKONOS data:
    - 1:10,000 digital maps - GCPs from road network
    - ground-truth GCPs with differential GPS for verification
    - existing orthophotos as geometric reference (if there is coverage)
  - maximum likelihood classification of IKONOS using training dataset already available from rapid field visits. Test on data with different pixel sizes (SPOT, IRS & Landsat)
- **ES-DAP (4 KP - c.121 km2 per site)**
  - data corresponding to sites controlled with aerial photography
  - selected sites have different characteristics for more comprehensive results
  - tolerance analysis
  - precision evaluation of automatic surface definition
  - cadastre-based georeference

Test Proposals (3)

- **ES-TRAGSATEC (1 KX - 119.77 km2)**
  - ⇨ series of tests to estimate the use of IKONOS imagery against medium-resolution satellite imagery
    - ❑ classification test - crops identification esp. for types difficult to identify with medium-resolution satellite imagery
    - ❑ radiometric and geometric quality
    - ❑ photo-interpretation precision
- **FI-NLS (1 KP - 120.71 km^2)**
  - ⇨ test geometric quality against archive photogrammetric control points
  - ⇨ most suitable parameters (number of control points, pixel size, polynom, possible ortho-rectification) to be investigated
  - ⇨ software and hardware requirements for image processing
  - ⇨ test suitability of IKONOS data for yearly updating of LPIS vector data
- **FR-SCOT (1 KS - 910.52 km2)**
  - ⇨ test against satellite imagery and archive orthophotos
- **FR-SIRS (2 KS - 239.14, 459.49 km2)**
  - ⇨ test against aerial photography of the same year

Test Proposals (4)

- **GR-ELPHO (1 KS - 118.87 km²)**
  - ⇨ parcel boundary validation
  - ⇨ CAPI
  - ⇨ production of field documents
- **GR-ERATOSTHENES (1KP - 119.4 km2)**
  - ⇨ mini control site
  - ⇨ use of panchromatic images for area control because of small parcel size
- **IE** (images not acquired)
  - ⇨ full site, panchromatic mode
  - ⇨ primary objective to test the value of IKONOS pan data for boundary validation and area measurements as a substitute of 1m orthophotos
    - ❑ full complement of 1m orthophotos has been primary image source since 1995
    - ❑ SPOT 10m pan insufficiently high enough to identify ineligible land areas for exclusion from parcels during area calculation
  - ⇨ Orthophotography is used to chose GCPs for satellite image ortho-rectification (IKONOS to be tested as a master image for Radarsat and SPOT)
  - ⇨ examine the possibilities of merging 1m data with lower resolution multi-spectral image (SPOT, RADARSAT) to enhance spatial and spectral resolution for improved land use determination

Test Proposals (5)

- **IT-CCIA (2 KX - 496.72, 487.15 km²)**
- **NL-GEORAS (1 KP - 197.91 km²)**
  - ⇨ The use of IKONOS data has an increasingly added value in sites with small plots, and irregularly shaped îlots. It may be a good alternative to aerial data (1:40,000 and 2m resolution) used so far
    - ❑ higher digitising accuracy leading to a better judgement of true over-declarations
    - ❑ less omissions in the identification of irregularities
  - ⇨ However operational logistics, spectral characteristics, geometric accuracy of data to be proven
  - ⇨ Evaluation and reporting
    - ❑ delay in receiving imagery
    - ❑ image format and readiness for use (match of image location with specs)
    - ❑ geometric accuracy (angle effects, image borderlines and cumulative effects)
    - ❑ spectral characteristics
    - ❑ differences in information content between 8bit aerial and 11bit satellite
  - ⇨ Test to assess
    - ❑ operational efficiency of IKONOS logistics in relation to aerial and satellite data
    - ❑ plot identification and measurement characteristics in relation to aerial and satellite data
    - ❑ spatial and crop identification potential in relation to SPOT and Landsat false colour data
- **PT-GEOMETRAL (1 KP - 962.28 km²)**

Test Proposals (6)

- **SE-SATELLUS** (image not acquired)
  - ⇨ mini-site, panchromatic mode
  - ⇨ County Administrative Boards to provide background material for evaluation of IKONOS data
  - ⇨ IKONOS data to be evaluated for
    - ❑ parcel measurements (comparisons with operational images regarding acceptable tolerances and number of rejected parcels)
    - ❑ ease of border detection
    - ❑ possible replacement of outdated orthophotos
- **UK-RSAC** (image not acquired)
  - ⇨ mini-site, pan-sharpened mode (edge of Athens cone)
  - ⇨ evaluate IKONOS data for adjusting crop areas during CAPI
    - ❑ sample of fields to be measured using both IKONOS and SPOT/TM
  - ⇨ geometric correction accuracy to be tested (low relief control site)

Test Results (1)

- **DE-GAF (1KS - 217.33 km²)** presentation

  input data quality assurance

  ⇨ cloud cover up to 20% on parts of the image
  - ❑ can`t be filtered by data processing methods
  - ❑ big handicap for the interpretation of the data
  - ❑ computer software Zeus can`t use 11 bit data (only 8 bit data used)

  ⇨ Good radiometric quality - no striping

  ⇨ Difficulty with GCP placement
  - ❑ frequent shadows due to hilly appearance of the landscape and low sun azimuth on acquisition date

  image processing

  ⇨ two pieces of software used
  - ❑ PCI-Orthoengine - good accuracy of product
  - ❑ GEOIMAGE - visual accuracy of the product seems to be quite high despite the fact that a error of max. 5 meter can be seen in some parts of the image (probably due to lower resolution DEM)

  ⇨ high resolution allows accurate detection of parcel boundaries

  ⇨ excellent interpretation of land use and crop detection

- **DK-DIAS (1 KP - 186.73 km²)**

  input data quality assurance

  ⇨ average cloud cover 25% and up to 50% on parts of the image

  ⇨ no striping

correction not completed therefore no further results

Test Results (2)

- **ES-DAP (4 KP - c.121 km² per site)** presentation
  - **input data quality assurance**
    - ⇨ UTM WGS84 instead of requested UTM ED50
    - ⇨ 11 bits dynamic range instead of requested 8 bits
  - **image processing**
    - ⇨ processing still in process - only preliminary results available
- **ES-TRAGSATEC (1 KX - 119.77 km²)**
  - **input data quality assurance**
    - ⇨ good general conditions of data
  - **image processing**
    - ⇨ image processing under way
- **FI-NLS (1 KP - 120.71 km²)**
  - **data received in good conditions and processing will be carried out in near future**

Test Results (3)

- **FR-SCOT (1 KS - 910.52 km²)**

  input data quality assurance

  - ⇨ image not cloud-free
  - ⇨ distinction of two zones; each zone has a homogeneous radiometry but northern one presents some saturation which does not pose any crops identification problems

  image processing

  - ⇨ excellent border detection
  - ⇨ IKONOS data facilitate good discrimination of small size features including small size agricultural parcels as well as area calculation
  - ⇨ IKONOS data facilitate the discrimination between different crop types
  - ⇨ some inconsistencies observed between cadastre and IKONOS data probably due to less accurate reference used for cadastre

- **FR-SIRS (2 KS - 239.14, 459.49 km²)**

  input data quality assurance

  - ⇨ 3% cloud cover on one image
  - ⇨ no haze; no significant saturation; good radiometric quality

  image processing

  - ⇨ polynomial transformation from UTM (WGS84) to LAMBERT (NTF) over each tile produced residual errors and final image mosaic was not continuous (30 GCP per image were necessary to have a continuous image mosaic)
  - ⇨ IKONOS images can be used only over sites where DEM is not necessary

Test Results (4)

- **GR-ERATOSTHENES (1KP - 119.4 km²)** presentation

input data quality assurance

- ⇨ good AOI placement; no haze; no saturation; no striping
- ⇨ high pixel resolution and radiometric quality of the image allows identification of sufficient number of accurate GCPs

image processing

- ⇨ taking into account that CARTERRA Geo images are geo-rectified, only deformations caused by relief displacement have to be corrected
- ⇨ two different methods were examined in order to incorporate altitude data into the geometric correction procedure (Polynomial rectification with additional parameters and Direct Linear Transformation)
- ⇨ the detection of certain crops of interest (for example cereals) can be facilitated if an IKONOS image is used at the CAPI stage
- ⇨ a recent IKONOS image is very helpful in cases were tree cultivation and eligible crops coexist in the same parcel
- ⇨ IKONOS compared to IACS orthophotos is much better in cultivated areas from a radiometric point of view (orthophotos seem to be clearer in bushy mountainous areas)
- ⇨ Wrong parcel identification, which is the main source of errors in the RS Control in Greece, can be eliminated if a fully computerised system (based on recent IKONOS images) is used during dossier data collection

Test Results (5)

- **NL-GEORAS (1 KP - 197.91 km²)**

input data quality assurance

- ⇨ good AOI placement; good GCP placement; no haze; no saturation; no striping

image processing

- ⇨ IKONOS data compared to aerial photographs (1:40,000 scale BW pan AGFA film type, scanning resolution 1 m and output pixel resolution 1,5 m); DTM generated with a grid size of 25 X 25 m and ortho-rectification performed
- ⇨ main advantage of IKONOS in relation to aerial photography was the homogeneity of the contrast and the amount of work to orthorectify 29 different images in relation to 1 file
- ⇨ However, the image model should be released in order to perform a proper ortho-rectification.
- ⇨ SPOT pan image did not supply enough detail to allow a proper digitising
- ⇨ still bare plots that were mutually only distinguishable from ploughing or seeding patterns, were totally invisible on SPOT and equally visible on the aerial and IKONOS data
- ⇨ The usefulness of IKONOS Pan is equal to Aerial photography. The specific degree of the usefulness depends on the resolution of the data in relation to the detail to be analyzed and on the date of recording (in relation to the crop cycles of the different crops). For Remote Sensing Control, 2 m resolution is adequate. In that respect paying for the 1 m IKONOS detail is a bit overpriced
- ⇨ aerial data and IKONOS are roughly equal in information content (depending of the date of recording) and both superior to SPOT Pan, Landsat ETM pan or IRS pan.
- ⇨ The advantage of IKONOS is its greater radiometric homogeneity and the smaller workload to have the data operational.
- ⇨ The disadvantage of IKONOS is that we pay for 1m resolution whereas 2-3 m would be equally useful and the fact that no ortho-rectification model is available for a proper registration

Test Results (6)

- **GR-ELPHO (1 KS - 118.87 km²)**

  input data quality assurance

  ⇨ good AOI placement; no haze; no saturation; no striping

  image processing

  ⇨ very good boundaries detection even at tree shadow (validated using B/W orthophotomaps produced from B/W photos acquired at 1992 - XY accuracy 2 m, pixel size 1m)

  ⇨ AOI included a lot of declared plots with pure cereals cultivation and IKONOS data proved to be of major importance during the CAPI

  ⇨ in comparison with other satellite images (SPOT-XS and LANDSAT ETM+), the advantage of IKONOS is that even plots of very small size can be interpreted and the cultivation type can be detected more accurately especially in cases of pure crops or crops with similar reflectance properties and different visual appearance

  ⇨ Information about the geometry of the camera can be very important for better ortho-rectification results

- **IT-CCIA (2 KX - 496.72, 487.15 km²)** presentation (ITA)

  input data quality assurance

  ⇨ good AOI placement; no haze; no saturation; no striping

  image processing

  ⇨ ortho- correction using the SPOT orbital model with good results

- **PT-GEOMETRAL (1 KP - 962.28 km²)** *no results received so far*

Conclusions

advantages

- IKONOS data facilitate crop detection and discrimination of small size features including small size agricultural parcels as well as area calculation
- In comparison with available ortho-photos, IKONOS data
  - ⇨ often provide updated information
  - ⇨ present better image homogeneity
  - ⇨ entail significantly less ortho-rectification work
- Encouraging preliminary results of the use of pan-sharpened product (1m resolution, multispectral)
- Good radiometric quality of data
- No haze or striping
- Satisfactory shipment and delivery of product
- AOI located according to specifications

disadvantages

- Athens cone coverage not including all EU Member States
- Lack of availability of orbital parameters
  - ⇨ as a result IKONOS images can only be used in a terrain with small topographic variations
- 63% image acquisition success rate (98% for RSC2000)
- Frequently higher cloud cover percentage than expected especially in Northern areas
- Cost per square kilometre

GESELLSCHAFT FÜR ANGEWANDTE FERNERKUNDUNG UND INFORMATIONSSYSTEME MBH
COMPANY FOR APPLIED REMOTE SENSING AND INFORMATION SYSTEMS

Ikonos-Session:
Orthocorrection and Comparison with Ortho-photos

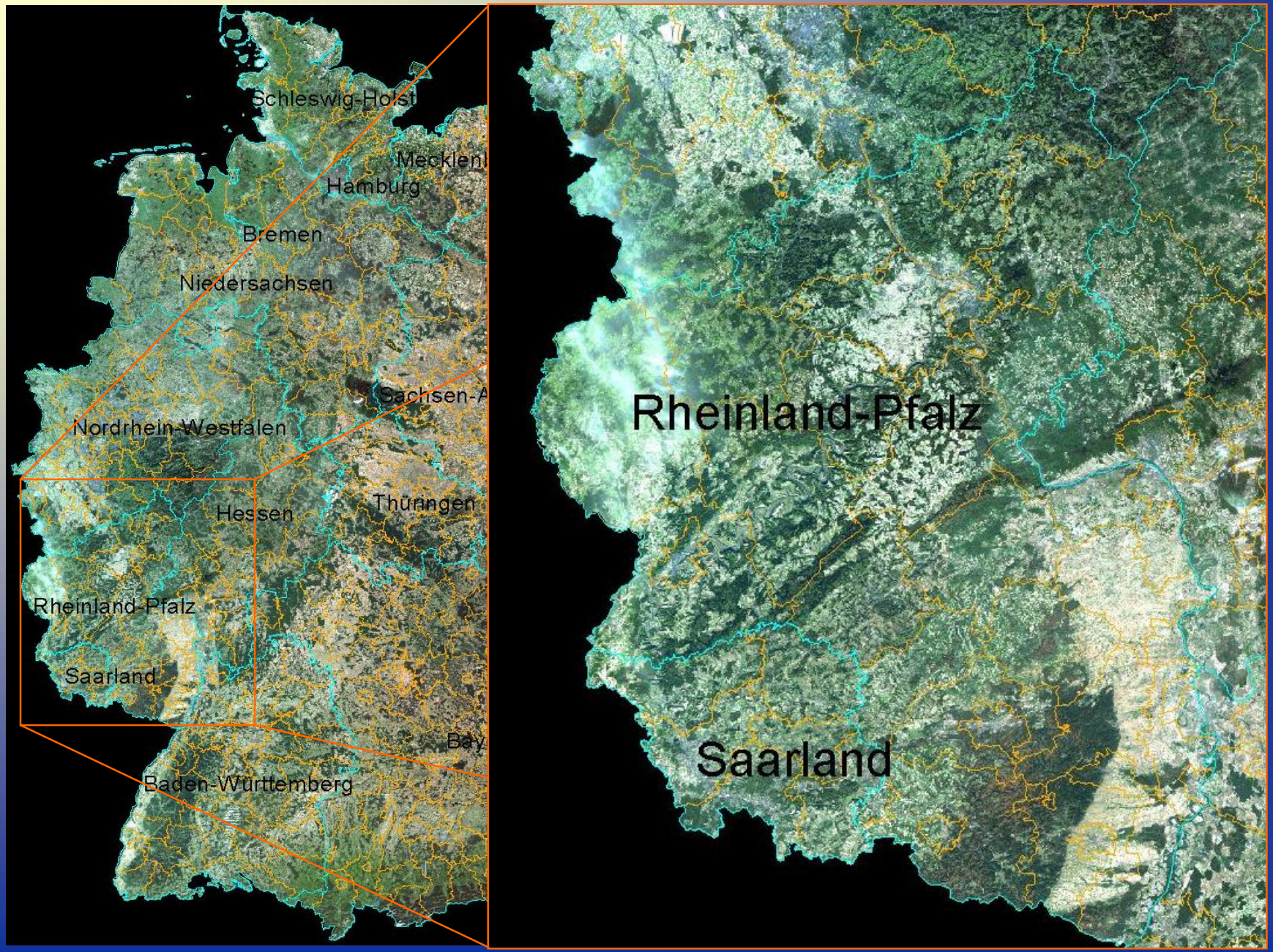
Thomas Kukuk, Daniela Miller,GAF mbH München

16.11.2000

6th Annual Conference on Control with Remote Sensing of Area Based Subsidies

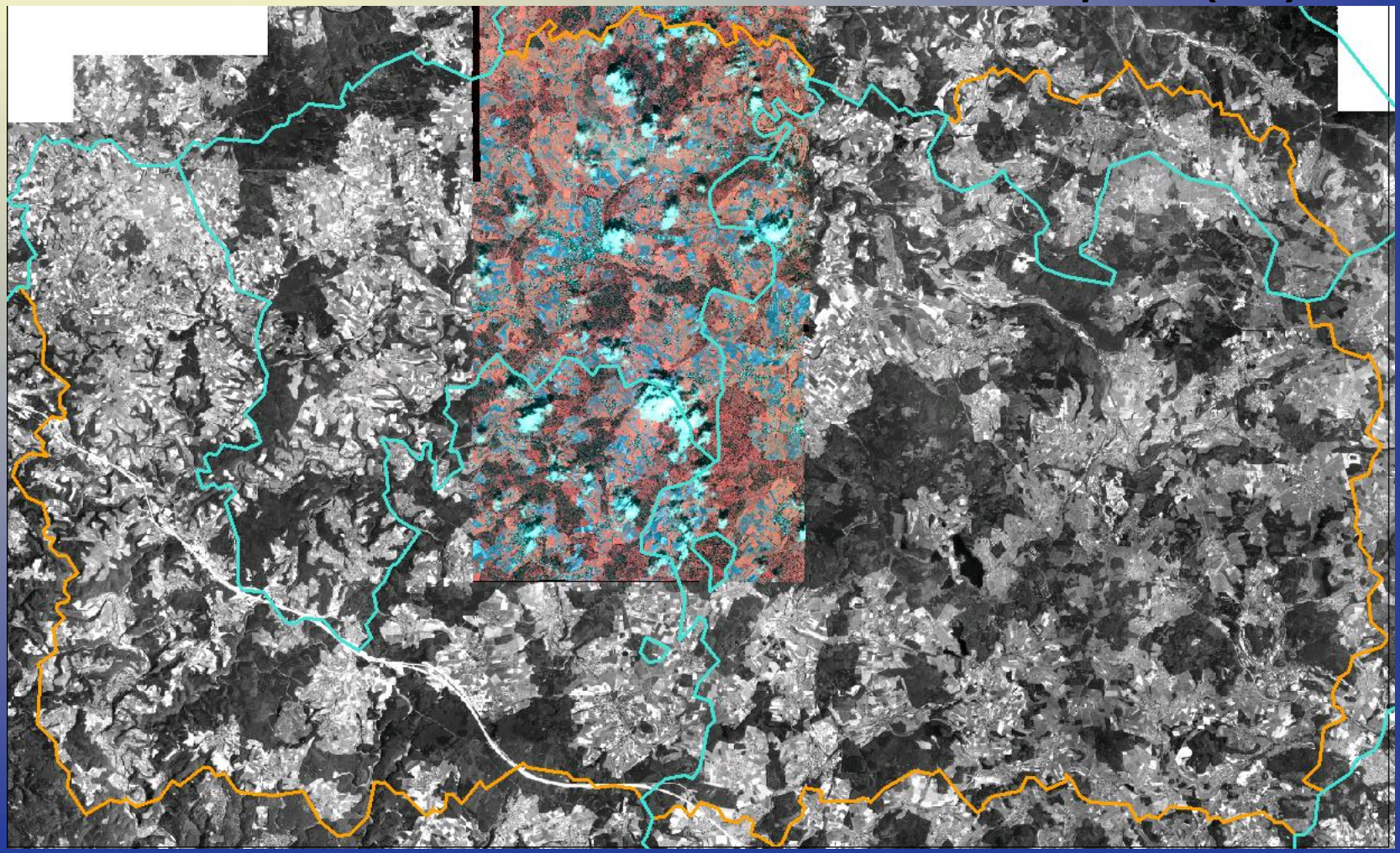
Structure

1. Discription of available Data
2. Orthocorrection of Ikonos with two software packages
3. Comparison of geometric accuracy: Ikonos – Orthophoto
4. Quality aspects


Schleswig-Holst
Hamburg
Bremen
Niedersachsen
Nordrhein-Westfalen
Hessen
Thüringen
Rheinland-Pfalz
Saarland
Baden-Württemberg
Rheinland-Pfalz
Saarland

Ikonos/ CIR coverage of control site in Rheinland-Pfalz (1378 km²)

Ikonos Ortho-photo (CIR)



Data Description

Orthophoto

- Acquisition date: 13 June 2000
- Acquisition time: 9:35
- Number images: 72
- Weather situation: cloudfree

Ikonos Image

- Acquisition date: 21 July 2000
- Acquisition time: 10:04
- number of images: 1
- Weather situation: partly cloudy

(cloud cover assessment 5-20% per quarter)

Orthocorrection

GEOIMAGE	PCI-Orthoengine
• polynomial method with DEM • no physical model	• rigorous Ikonos method • reflect the physial reality: using the basic information from the metadata /image files • carried out by GEOVILLE (Innsbruck)

Comparison of the results

Transformation accuracy

RMS

Correction Method	RMSe X	RMSe Y	RMSe XY	Max. RMSe X	Max. RMSe Y
Polynomial Model (Geoimage)	0,98	0,81	1,27	2,35	2,3
Rigorous Model (PCI-Orthoengine)	0,7	1,00	1,22	1,75	2,48

Checkpoints

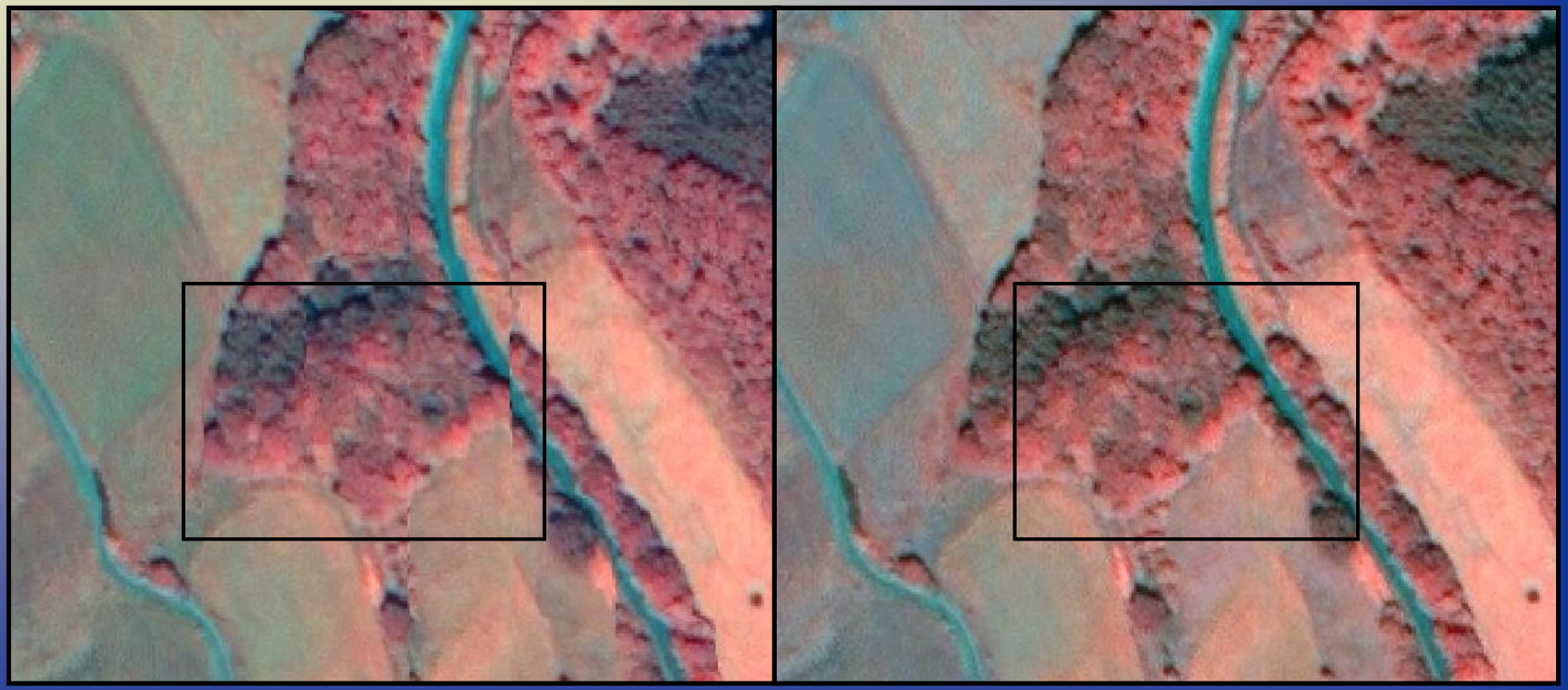
Correction Method	RMSe X	RMSe Y	RMSe XY	Max. RMSe X	Max. RMSeY
Polynomial Model (Geoimage)	0,96	0,85	1,28	2,35	1,5
Rigorous Model (PCI-Orthoengine)	0,78	1,26	1,48	1,23	2,65

For a good comparison all the results were processed in Geoimage Software

Orthocorrection with Geoimage

Image with 40 meter DEM

Image with 5 meter DEM



Orthocorrection with Geoimage

Image with 40 Meters DEM

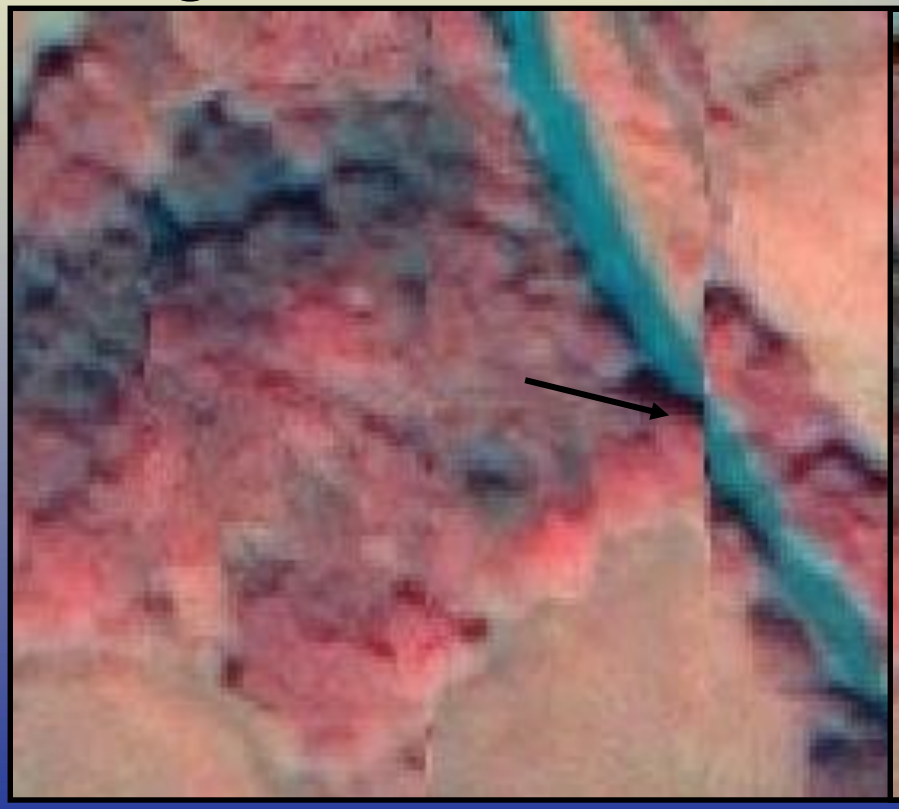


Image with 5 Meter DEM

Comparison of the geometry
- Ikonos image versus cadastral vectors -

Geoimage - PCI-Orthoengine

Comparison of geometric accuracy

Ikonos versus Orthophoto

Checkpoints

Correction Method	RMSe X	RMSe Y
IKONOS (PCI-Orthoengine)	0,78	1,26
Orthophoto	0,74	0,95

Visual comparison of the geometric accuracy

Ikonos versus Orthophoto

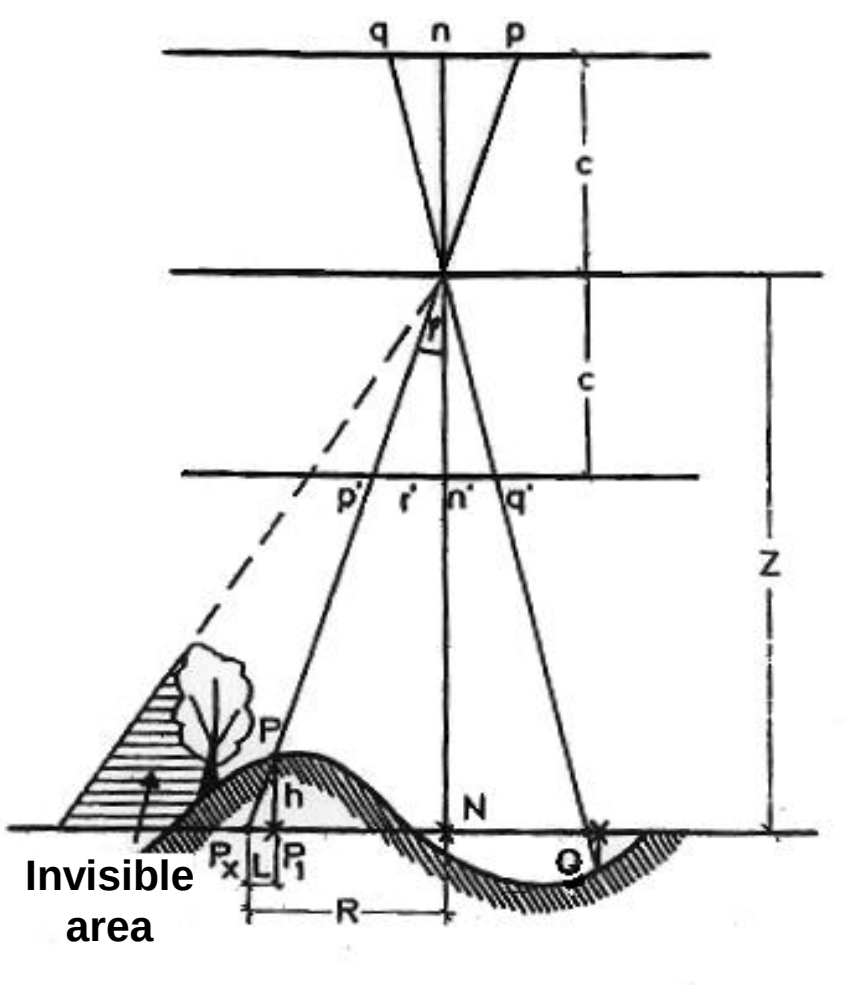
Quality aspects of orthophotos: Influence on the DEM quality and resolution

Quality aspects of orthophotos: viewing angle and atmospheric impact are clearly visible here

Ikonos

Aerial orthophoto

Invisible area: Dependence on flight altitude

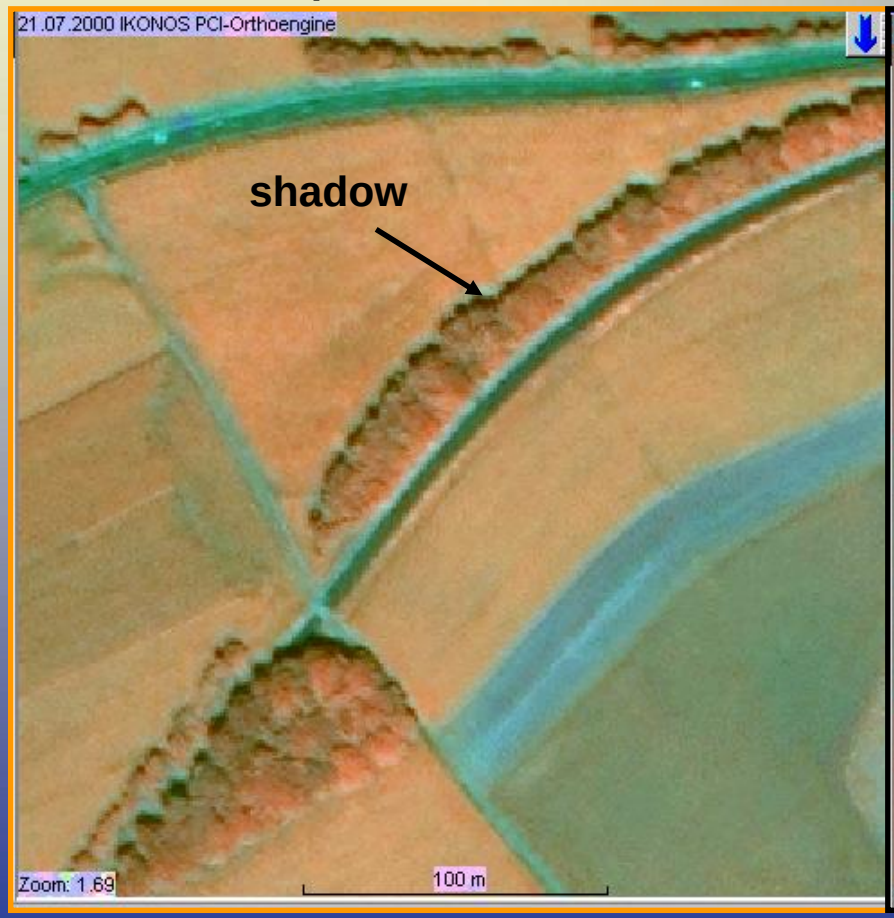


Object level

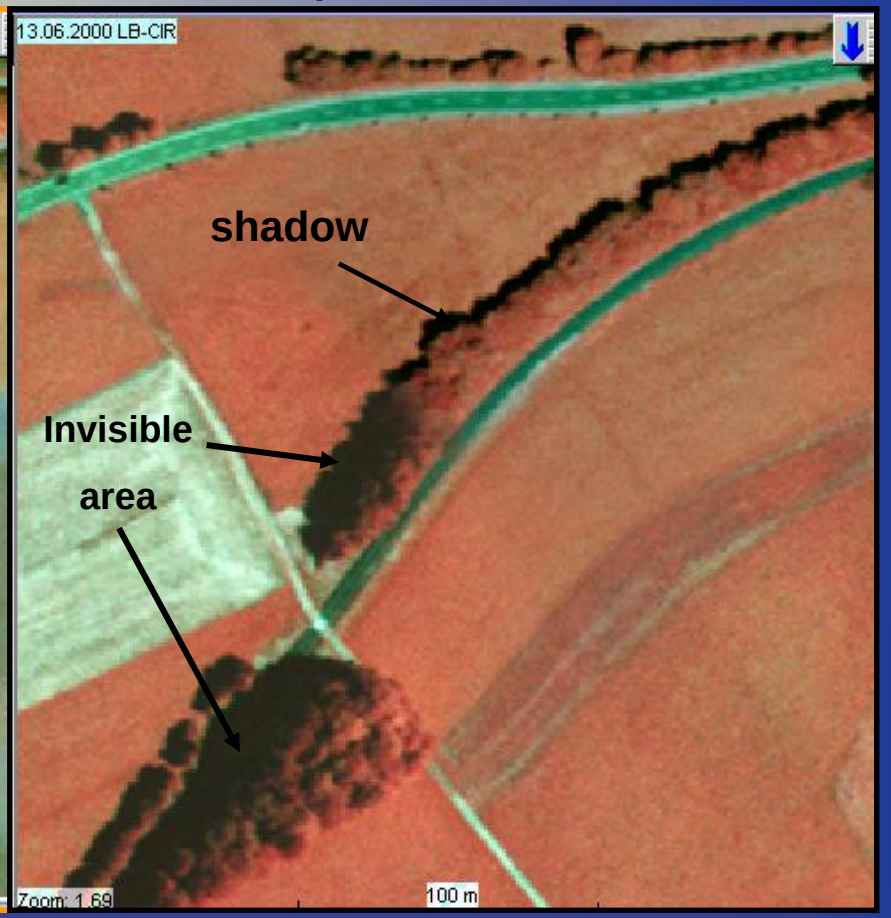
Flight altitude

Influence of shadow and invisible area

Acquisition time: 10:04



Acquisition time: 9:35



Summary

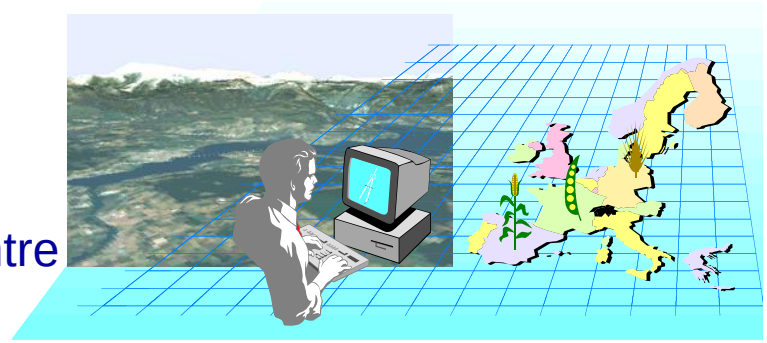
- Overall (geometric) quality of the Ikonos image is equal to orthophotos
- system inherent advantages and disadvantages are existing:
  - up to 20% cc accepted for Ikonos images
  - result and accuracy of geometric correction defined by used SW and basic geometric data (DEM…)
  - higher orbit decreases invisible areas (if sensor not tilted), but increases atmospheric impact
- fast acquisition and coverage of a complete control site is of highest importance for RSC (here the production of aerial orthophotos is faster in the moment)
- large amount of data according to the resolution leads to handling problems in usual satellite image processing SW
- precise satellite data is expensive

Space Applications Institute

6th Annual Conference on Control with Remote Sensing of Area-based subsidies 16-17 November, 2000

Session 1: Quality Control - Conclusions of 1999 campaign

by Josiane Masson, JRC



Space Applications Institute
Directorate General Joint Research Centre
European Commission
21020 Ispra (VA), Italy
http://www.sai.jrc.it

Space Applications Institute

SIGNIFICANT CHANGES FOR 1999 QC

- **Development of a new QC software based on PC Windows NT platform on ACCESS + Arcview**

  Important delays in the development due to resources and contractual problems
- **ITT for technical support for the QC processing: HTS contractor for 3 years campaigns (1999-2001). Some delays in the signature of the contract (mid-November)**

- **Significant amendments of 1999 Recommendations Part 4 to better take account of the various types of dossiers within EU:**
  - ⇨ **Major changes in the structure of parcel tables**
  - ⇨ **Provision of a Template ACCESS database with pre-defined tables in order to simplify the integration of input data.**
- **Significant changes in the methodology**
  - ⇨ **More detailed checks of diagnostic: recalculation of diagnostic at parcel, group and dossier level; extrapolation of corrections on final diagnostic**
  - ⇨ **First stage checks for all contractors: minimum control of all QC sites, 1st stage report delivered, corrections in order to avoid artefacts as far as possible**
  - ⇨ **Additional QC of images (control of the quality of geometry)**

FLOW CHART OF 1999 QC

National Administrations

SELECTION OF 1 QC SITE PER CONTRACTOR

Contractor

DELIVERY OF QC INPUT DATA

JRC

SELECTION OF QC SITES TO BE FULLY CONTROLLED

All QC sites

FIRST STAGE CHECKS

- **FORMAT COMPLIANCE**
- **QUICK CHECK OF CONTENTS**
- **COMPARISON WITH STATISTICS**

FIRST STAGE CHECKS REPORT

JRC

6 QC sites

DATABASE CHECKS

- **COMPLIANCE CONSISTENCY**
- **CROSS CHECKS**
- **DIAGNOSTIC CHECKS**

CAPI CHECKS

- **LAND USE**
- **BOUNDARIES**
- **TECHNICAL CODES**

CONTROL OF IMAGE QUALITY

QC REPORT

DISCUSSION, MEETING WITH NATIONAL ADMINISTRATION AND CONTRACTORS

FINAL CONCLUSIONS

Space Applications Institute

SCHEDULE - 1999 QC campaign

Main milestones	Planned	Actual	Progress status
Delivery of QC data by the contractors	Deadline 01/08/99	From 17/09/99 to 25/11/99	Delays for 5 contractors, 4 contractors sent also corrections
Delivery of 1st stage checks report by JRC	Final: end of December '99	From 28/09/99 to 27/05/99	Planned for all QC sites but completed for 17 (2 sites not covered)
Delivery of QC report by JRC	15/01/99 to 15/03/00	From 17/02/00 to 23/05/00	Significant delays (problems JRC resources, delays HTS contract and software development)

Space Applications Institute

PROJECT MILESTONES

- **Except from some contractors, the delivery of QC data was improved in 1999.**

But…

- **Significant delays on JRC side due to:**
  - ⇨ **Resource allocation problems with the JRC staff**
  - ⇨ **Late signature of HTS contract**
  - ⇨ **Delays in the development of the new software**
  - ⇨ **Finally it was decided to drop 1st stage checks for 2 contractors (GAF + CCIA) in order to concentrate on the full QC sites.**

- **Compared to previous campaigns (1995-1998) reduction of the number of QC sites to 6, justified by:**
  - ⇨ **more multi-years contractors**
  - ⇨ **additional tests and control for QC sites which are fully checked**

Space Applications Institute

QC SITES SELECTED FOR FULL QC

No	Country	Contractor	Selected for database and CAPI checks	Selected for QC of images
1	DE	EFTAS	X	
2	AT	GEOSPACE	X	X
3	SV	SSC SAT.	X	X
4	UK	RSAC	X	
5	SP	DAP	X	X
6	GR	GEOAPIKONISIS	X	X
(7)	SP	TRAGSATEC		X
(8)	PO	GEOMETRAL		X

Space Applications Institute

CONCLUSIONS OF 1ST STAGE CHECKS

- A VERY POSITIVE POINT IS THAT THE CONTRACTORS FOLLOWED QUITE WELL THE RECOMMENDATIONS. THE MAJORITY OF THEM USED THE TEMPLATE OF THE ALPHANUMERIC DATABASE PROVIDED BY THE JRC WHICH SIMPLIFIED THE QC DATA IMPORT PROCEDURE
- GOOD COLLABORATION JRC/CONTRACTORS TO TRY TO SOLVE PROBLEMS BEFORE SENDING THE DATA

- IDENTIFIED PROBLEMS:
  - ⇨ Use of ilots/block table not always well understood (simplification by the JRC => Recommendations part 4, 2000)
  - ⇨ Problems with delivery of original maps of reference
  - ⇨ Cross-checking with reference area not always possible (missing or impossible due to the use of internal parcel id.)
  - ⇨ Some contractors could not use the database template (additional fields, additional tables): SP, FINL, UK (scheme managed at parcel level)
  - ⇨ in 2 cases, vector files and/or orthophotos not in the right format
  - ⇨ in 1 case, errors found in alphanumeric database (requires corrections by the contractor)

CONCLUSIONS OF FULL QC (DATABASE CHECKS AND CAPI)

- **Globally 1999 QC results were quite good:**
  - ⇨ **Improvements for the 2 contractors already controlled last year (DAP and EFTAS)**
  - ⇨ **Good results for the 2 new contractors (UK, SW)**
  - ⇨ **Fruitful discussion with the German administration and contractor to clarify some points**

- **IDENTIFIED PROBLEMS:**
  - ⇨ **Main problems found at parcel level: inconsistencies in the application of technical codes, problems in the identification of overlaps and the application of A2 code (might be a general problem to be discussed with all contractors), unclear rules when applying several codes (priorities to be fixed up in a similar way)**
  - ⇨ **Inconsistencies of retained area at parcel, group and dossier level that are sometimes artifacts in the QC database. It is recommended that the contractor cross-check the data before delivering QC data.**

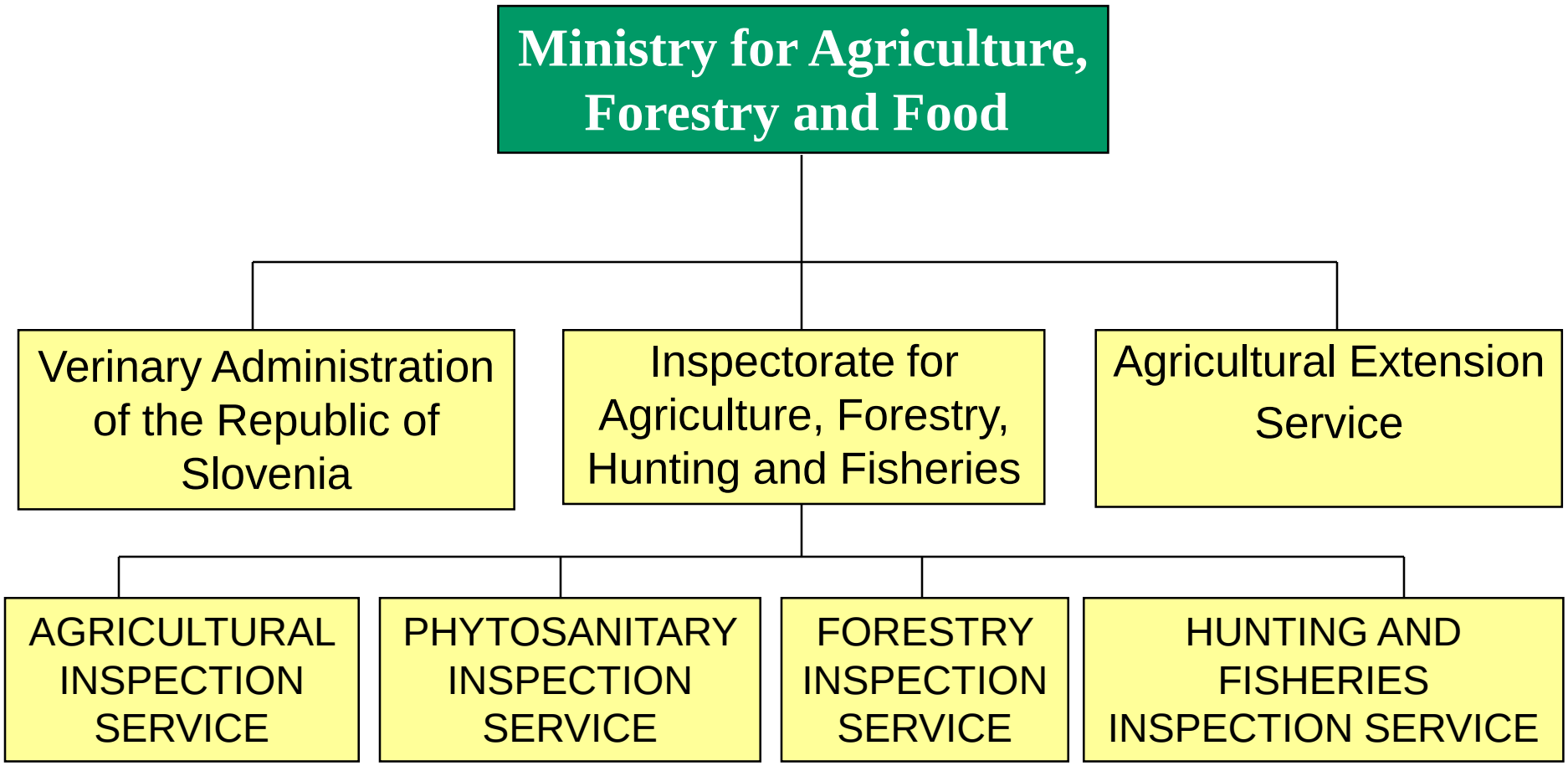
CONCLUSIONS OF FULL QC (DATABASE CHECKS AND CAPI) - 2

- **IDENTIFIED PROBLEMS (follows)**
  - ⇨ **Difficult to cross-check with the LPIS reference parcel area (not correct in many cases). The use of LPIS reference area should be clarified by the contractors (e.g. discussion with NL)**
  - ⇨ **Minor discrepancies found in the categorization at group and dossier level. Low impact of discrepancies found at parcel and group level by QC.**
  - ⇨ **More specific problems:**
    - ❑ **Early last image in Germany (15/06/99) which made discrimination between summer crops (mostly maize) and grassland difficult. Recommended by the JRC to use additional summer image or rapid field visit: both methods were used in 2000.**
    - ❑ **Difficult conditions and important delays in Greece due to the implementation of the new LPIS (43% of rejected dossiers). LPIS orthophotos not used for RSC in spite of the recommendation of the JRC; use of SPOT P images with 6.2m tolerance not adapted to parcel size.**

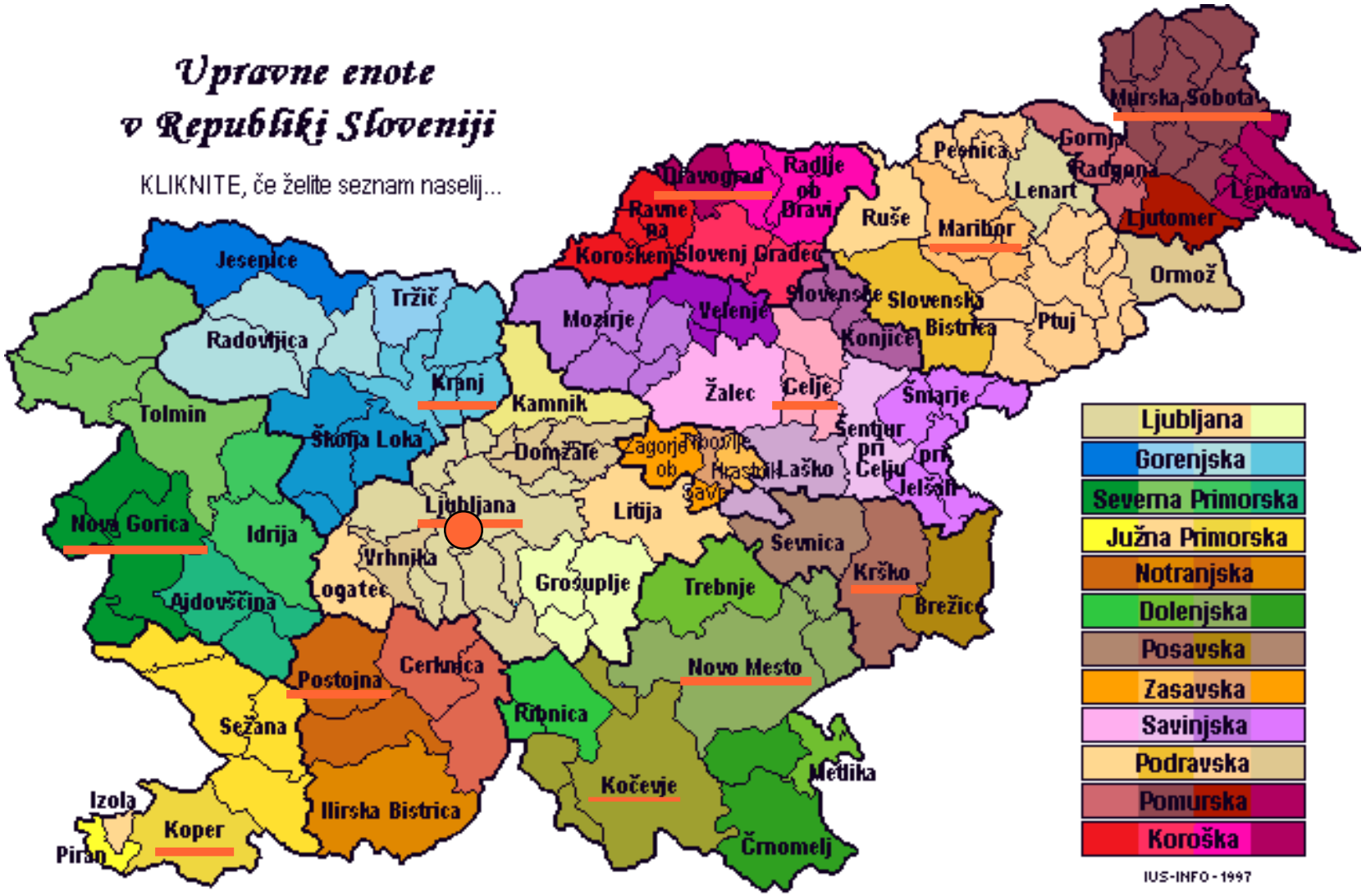
INSPECTION CONTROL FOR AREA BASED SUBSIDIES USING REMOTE SENSING METHODS IN SLOVENIA

- Organisational structure
- Legislation in force, acquis communautaire
- Land register and aerial data
- Direct payments and on-the spot inspections
- Methods of measurements for IACS scheme
- Inspection reports and irregularities found

Organisational structure of the MAFF

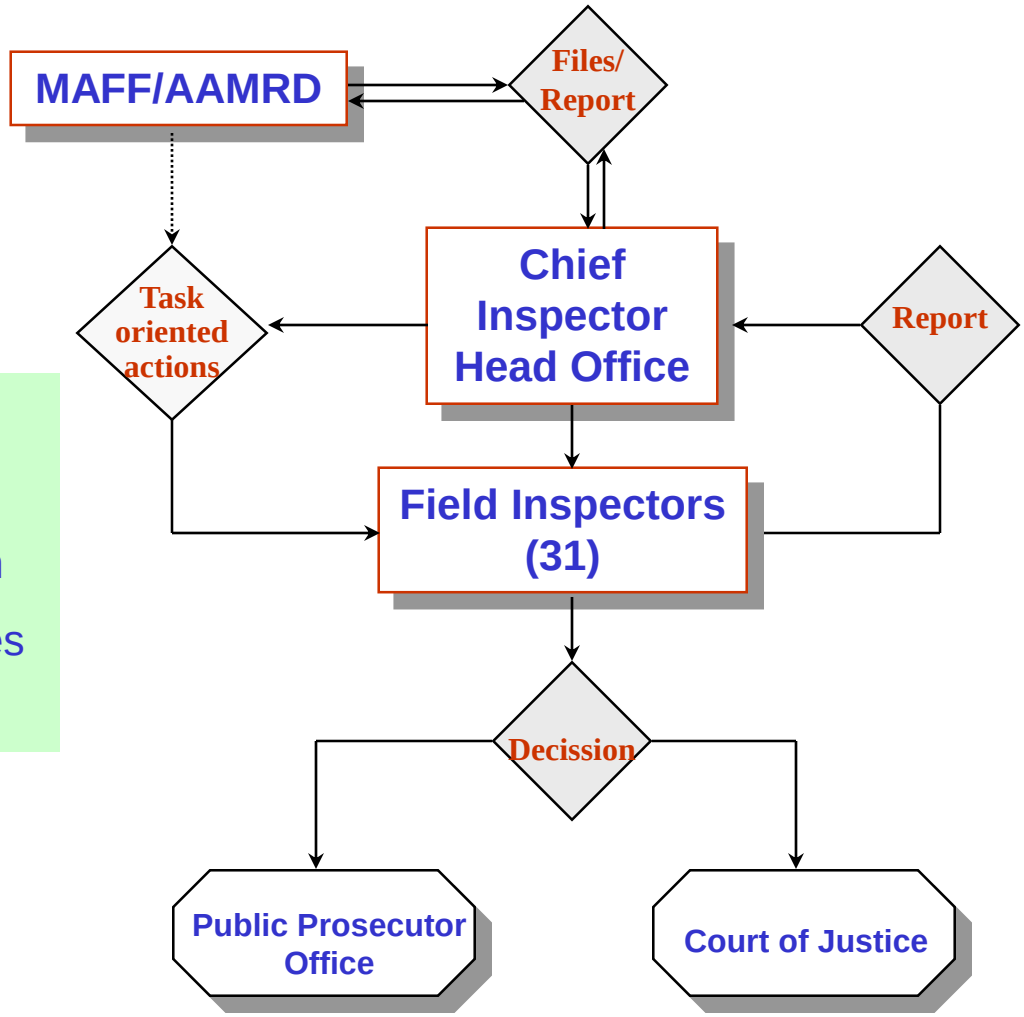


Administrative units of the Agricultural Inspection Service (AIS)



Flow chart on inspection report (AIS)

- 31 agricultural inspectors
- 4 senior inspectors
- university degree education
- acting upon 9 national codes
- 3 novelties on CAP



Legislation in force, acquis communautaire

- Law on agriculture (OJ RS, No. 54/2000) applying three novelties like rural development scheme -SAPARD, direct payments - IACS and intervention taking overs;
- Decree on Financial Interventions for Preservation and Development of Agriculture and Food Supply (OJ RS, No. 27/2000);
- Personal Data Protection Act (OJ RS, 59/99);
- SAPARD scheme under EC Regulations 1663/89, 1257/99, 1750/99, 1258/99, 1260/99, 1268/99, 1269/99, 2759/99;
- IACS Integrated adminstrative Control System (EC Regulation 3387/92, 2801/1999) implementing the use of remote sensing and additional cheks shall be carried out by means of traditional on-the spot cheks for certain Common Market Organisations (arable crops and beef).

Land register and aerial data

- subsidies 2000 provide data for **Temporary Register of Farms and Subjects** (TRFS) like parcel usage, parcel attributes, farm ID, Register of Territorial Units, Registry of Subjects and cross-checks tables;
- 62315 agricultural holdings are applying for direct payments in the year 2000 with 81000 legal or physical persons involved; according to the survey from june 2000, done by the Statistical Office of the RS (SORS) there are 92561 agricultural holdings and 172 agricultural enterprises;
- out of 785000 ha of utilised agricultural area (UAA) 231000 ha pertain to the arable land and 496000 ha to permanent pastures, the rest are permanent crops (EUROSTAT 1998);
- average size of the family farm is 4,8 ha of (EUROSTAT 1998);
- 55195 agricultural holdings is breeding 471425 bovine animals;
- data in TRFS can be accessed through software application BAKHOS on PC Windows 95 with user name and password required. Database is in Oracle/UNIX system on separate server located at MAFF. Another application is possible through special WEB application via leased, ISDN or analog lines (SW explorer, netscape) intended for Extension Service and Inspectorate for Agriculture;

Land register (continued)

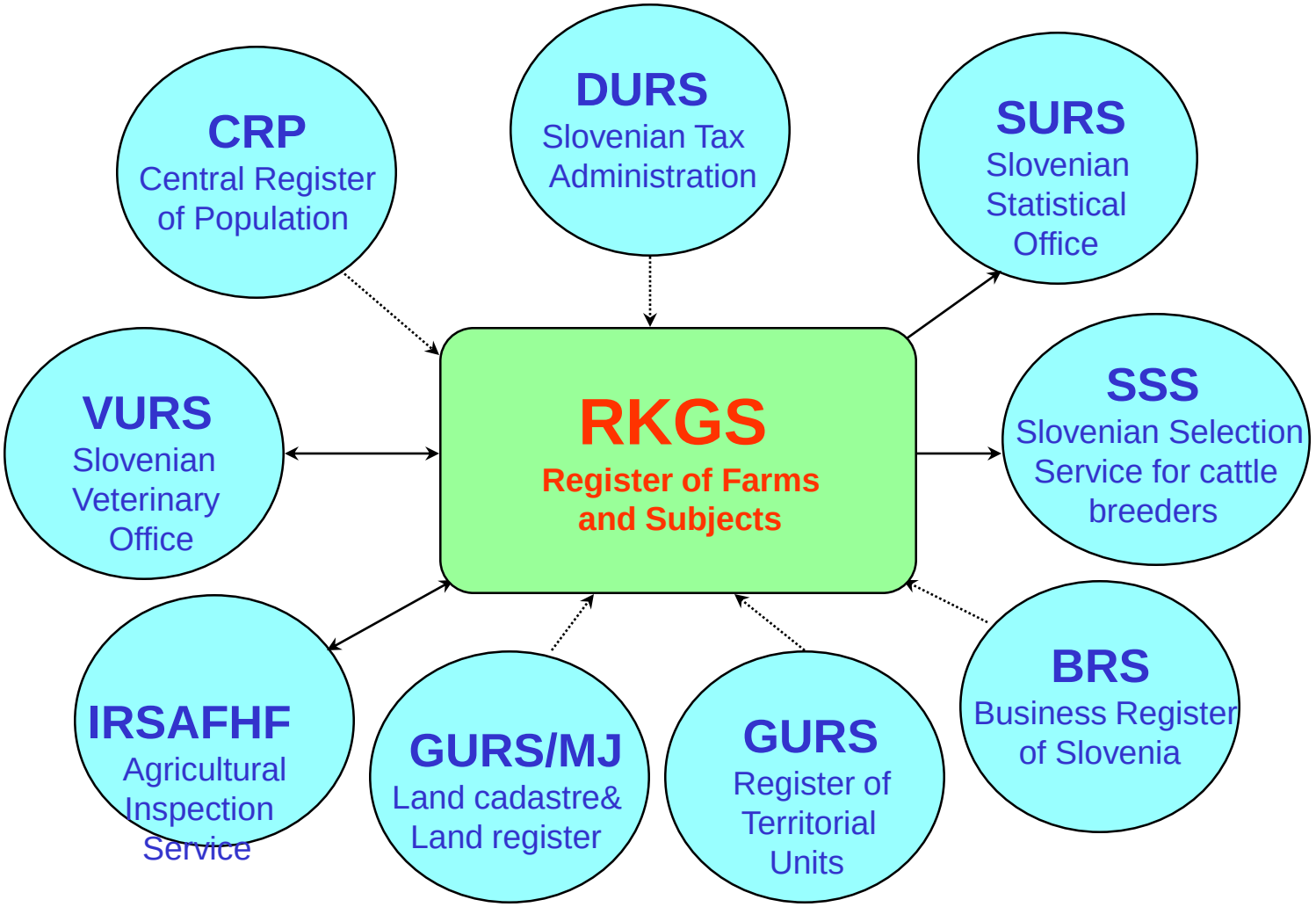
Breakdown of agricultural holdings by class size of UAA (SORS, 1997 survey)[1]

	Family farms			Agricultural enterprises			Total		
	number	000 ha	% total	number	000 ha	% total	number	000 ha	% total
TOTAL	**90602**	**430,6**	**100**	**108**	**36,0**	**100**	**90710**	**466,6**	**100**
< 1 ha	8448	5,3	1,2	1	0,0	0,0	8449	5,3	1,1
1-5 ha	51113	140,4	32,6	8	0,0	0,1	51121	140,4	30,1
5-10 ha	22469	159,8	37,1	3	0,0	0,1	22472	159,8	34,3
10-30 ha	8335	116,5	27,0	19	0,4	1,0	8354	116,8	25,0
30-50 ha	178	6,2	1,4	9	0,4	1,0	187	6,5	1,4
50-100 ha	32	2,1	0,5	12	0,9	2,5	44	3,0	0,7
100-500 ha	2	0,3	0,1	38	9,2	25,5	40	9,5	2,0
500-1000 ha	0	0,0	0,0	6	3,5	9,7	6	3,5	0,7
>1000 ha	0	0,0	0,0	12	21,7	60,2	12	21,7	4,6

[1]farms without area farmed are excluded

Land register and aerial data

External data base management system - proposal



Direct payments and on the spot inspections

Direct payments	Slovenian legislation	EU legislation
Checks within or outside retention period	10 % of all claims or in conformity with EU rules	- 10 % of all claims for animal premia; - 5 % for arable land
Type of direct payments for arable land and animal premia	EKO 0 - arable crops, hops EKO 1 - LFA EKO 2, 3 - ecological farming; - integrative farming of fruits and vegetables; - protection of erosion in vineyards Suckler cows, ovine, caprine, mairs	- EC R3508/92, 3887/92, 2801/99 (IACS); - 1251/99, 1253/99, 1257/99 (DP); - EC R 1254/99, 2629/97, 820/97, 2629/97(SCP; SP; SBP); - set aside should take at least 10 % of arable land; - irrigated and non irrigated area
Risk analyses for the year 2000	Decentralised approach based on NUTS 3 level	Centralised approach based on IT protocols within the Paying Agency
Irregularities found	- 0 - 10 % (substraction of declared value) - > 10 % or over 1 ha (exclusion from the payment scheme for 2 years)	- 0 - 3 % (substraction of declared value) - 3-20 % (substraction from the declared value which is two fold the difference) - >20 % (exclusion from the paymnet scheme for 2 years)

Methods of measurements for IACS scheme

Method of measurement	Relative degree of accuracy
Measuring type, compass, odometer	2 % of the distance measured
Orthophotos (scale 1:5000)	5 % of the area measured
Planimeter/theodolite	1 % of the area measured

Planned methods of measurements	
Satelite images/IKONOS pilot project	pixel entitiy of 1 m^2
GPS/Trimble Geoexplorer 3[1]	1 % of the area measured with no orthogonal projection on inclined terrain

[1]GPS system should be evaluated for financial costs

Inspection reports and irregularities found

- 62315 applications have been submitted for direct payments in the year 2000 (“0 year”);
- point de depart for inspection: 15 june, 2000
- every applicant out of 10 % has to be checked for on-the spot control using digitalised cadastre if possible;
- an inspection report is provided usually un-announced,
- reports are archived on a decentralised manner with sketches of measurements, type of measurement and irregularities found and signed by the beneficiary;
- web applications are used by each inspector to enter the reports and submitted to the head office in a timely manner

Inspection reports and irregularities found

Code	Irregularity	Ex-ante control	Ex-post control	Penalty code	Pending the payment
	DOCUMENTATION				
I0001	Beneficiary does not allow the inspection control	I1005	I1006	I2002	YES
I0002	Beneficiary does not keep the carbon copies	I1009		mandate penalty ex-post	
I0003	Beneficiary does not keep the cadastrial maps	I1001=>I1011	I1001=>I1014		YES
I0004	Actual land use is not drawn in the cadastrial maps	I1009	I1009		
I0006	Contract for land leased is missing (only legal p.)	I1001=>I1008	I1001=>I1013		YES
I0007	Administrative error at MAFF	I1010	I1010		
I0008	Report is not signed by the beneficiary - PAA				
	AREA				
I0101	Areas decl. are < than 10 % (1 ha) from determined	I1002	I1015		YES
I0102	Areas decl. are > than 10 % (1 ha) from determined	I1003	I1004		YES
I0103	Unit is not sown with the crop declared	I1007	I1012	I2001	YES
I0104	Unit is not sown with the crop declared but=subsidy	I1002	I1015		
I0107	Areas are overgrown totally	I1007	I1012	I2001	YES
I0108	Good farming practise is missing - Law on Agric. L.	I1001=>I1003	I1001=>I1004		YES
	ANIMALS				
I0201	Dairy cows declared as heifers	I1007	I1012	I2001	YES
I0202	Ear tags are missing (number)	I1001=>I1016	I1001=>I1017		YES
I2003	Number of animals have been decreased	I1002	I1015		YES
I0206	Beneficiary has declared animals in non existance	I1007	I1012	I2001	YES
I0207	Agricultural holdings delivers milk/prod. to a dairy	I1003	I1004	I2001	YES
	OTHER				
I0301	Force majeur - VIS MAIOR	I1002	I1015		

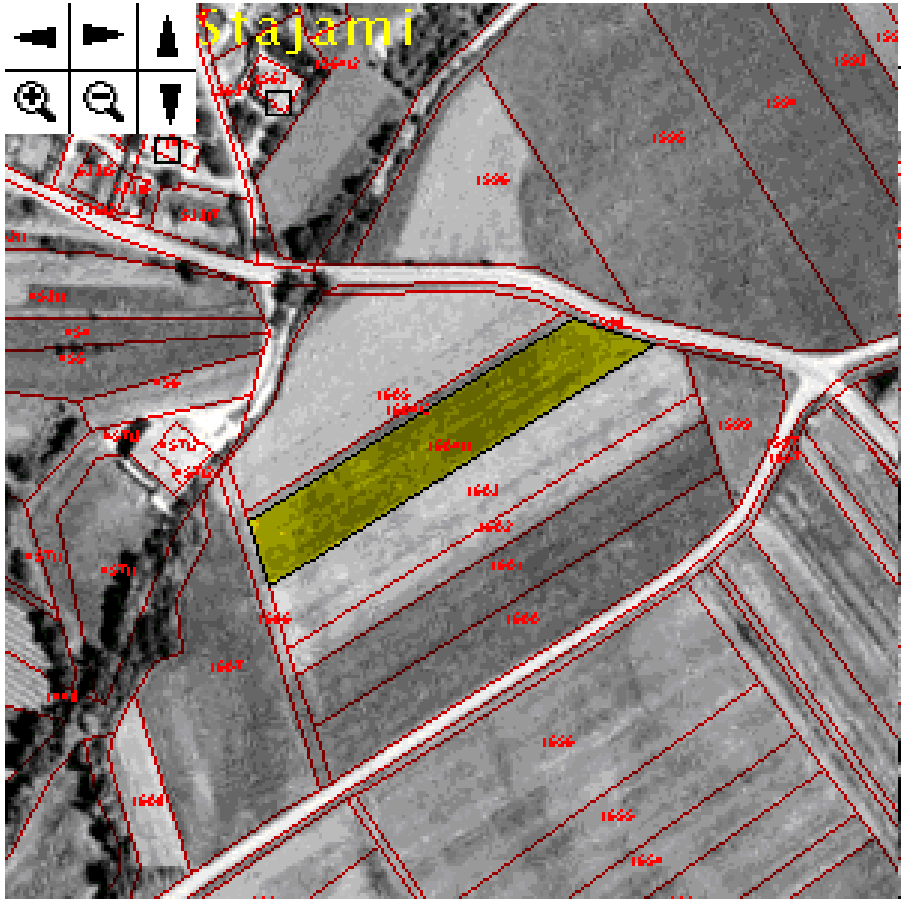
Inspection reports and irregularities found

Code	Measure				
I1001	Inspector orders the elimination of deficiency				
I1002	Application confirmed at the actual extent				
I1003	Application rejected for a measure for 2 years				
I1004	Repayment for a measure and exclusion for 2 years				
I1005	Application rejected in total				
I1006	Repayment for the application in total				
I1007	Application rejected in total and exclusion for 2 y.				
I1008	Application rejected for parcels with no contract for land owned by the community or state				
I1009	Warning of the inspector				
I1010	Warning of the Agency for the Agricultural Markets				
I1011	Decision issued by MAFF of rejection of incomplete unit with no cadastrial map				
I1012	Beneficiary has to repay all ineligible funds with the interest rates, exclusion for 2 years for all schemes				
I1013	Beneficiary has to repay funds for parcels with no contract with legal person(community or state)				
I1014	Beneficiary has to repay funds for parcels with no cadastrial maps				
I1015	Beneficiary has to repay the funds according to the actual state of the art				
I1016	Application rejected for animals not ear-tagged				
I1017	Beneficiary has to repay funds for animals not ear tagged				

Inspection reports and irregularities found

Code	Penalty codes	Legal person		Physical person	
		Article on Law on agriculture			
I2001	Beneficiary has declared false data intensionally	122(1(1))		122(3)	
I2002	Beneficiary does not allow monitoring, scrutiny and on-the spot control, does not submit the documents, subjects within the premises and is not given adequate explanations	123(1(1))		123(3)	

Land register and aerial data



POLYGON ENTERED

graphical area	0 ha 35 a 93 m2
cadastrial area	0 ha 34 a 28 m2

LIST OF PARCELS

Cadastrial community 2400 SLAP

PARCEL	% of use
1606	2,21
1603	3,86
1604/1	99,07
1604/2	9,74

Regulation 1593/00

IACS and Geographic Information Systems

Background

- Adjustments in the CAP (Agenda 2000) made changes to 3508/92 necessary
- IACS led to significant progress in reducing risk
- Difficulties in clearing up anomalies in declarations
- Experience in MS's and technology improvement

⇒Have lead to the introduction of a modern geographical information system (GIS)

Land Parcel Identification

- GIS improves reliability of identification of parcels
  - Indication of location and area of parcels by farmers has become easier
  - Supporting images (ortho-photography, satellite images) can resolve possible conflicts a-priori.
- Reliable parcel identification system is a key for control

Issues in GIS

- Does GIS substitute the cadaster ?
- How legal is the new system ?
- With what to start ?
- Digitize what ?
- What GIS to select ?

Does GIS substitute the Cadaster ?

- No, and this was never the objective
- Cadaster gives boundaries of legal property
- Cadaster is poor representation of agricultural land use
- However, the cadaster
  - contains accurate points of reference
  - is useful for general localization
  - adds a legal aspect to area of property
  - combined with aerial photography is a powerful base

How legal is the new system ?

- As legal as you want it to be
- IACS needs an accurate number for area of declaration, not the property size
- It is the duty of a MS to arrive at accurate area measurements

With what to start ?

- Only recent imagery can show the true parcel boundaries (ortho-photos, high-res. sat. images)
- Cadaster can give you good view of where you are and the property boundaries
- Cadaster good quality ?
- Cadaster digitally available ?
  - Raster (geo-referenced?)
  - Vector (attribute list?)

Digitize what ?

- Boundaries
  - using the underlying imagery
  - using the rasterized/vectorized cadaster
  - in a new layer (future LPIS layer)
  - non agricultural areas too
- Attributes
  - parcel ID most important
  - parcel ID link to all other attributes (application, size in cadaster, crop type, …)

GIS specifications

- GIS is "A computer system capable of assembling, storing, manipulating, and displaying geographically referenced information , i.e. data identified according to their locations"
- Respect tolerances given in working document
- think about the WWW
- think about the data interchange format (change of system, COM might ask in future,…)

What GIS system to select ?

- Commercial (ARC/INFO, Intergraph, …)
  - + Works, warrantee, helpdesk, user-group, documentation, people who know, full featured
  - - expensive licenses, up-grades
- Shareware/freeware (Grass, …)
  - + Low cost, user-groups
  - - Might not work always, like an exotic car
- Home made
  - + Cheap, does what it should do, flexible, no licensing
  - - Expensive, no user-group, documented ?

Ministry for Area-Planning, Agriculture and Environment of the Federal State Sachsen-Anhalt

Project to the Introduction of a Geographical Information System (GIS) in the field of the Integrated Administrative Control System (IACS) in Sachsen Anhalt

Andreas Hagen
MRLU-LSA
Referat 64
Tel. +498391)567 1831
Fax: +49(391)567 1942
Mail: hagen@mrlu.lsa-net.de

Ministry for Area-Planning, Agriculture and Environment of the Federal State Sachsen-Anhalt

Sachsen-Anhalt

Ministry for Area-Planning, Agriculture and Environment of the Federal State Sachsen-Anhalt

Magdeburg

Ministry for Area-Planning, Agriculture and Environment of the Federal State Sachsen-Anhalt

Sachsen- Anhalt

Agriculture	11.800 km²
Forestry	4.720 km²
Other	3.925 km²
Total	**20.445 km²**

Ministry for Area-Planning, Agriculture and Environment of the Federal State Sachsen-Anhalt

Sachsen- Anhalt

4 Offices for Agriculture and field reorganization

Altmark *(Stendal)*

Mitte *(Halberstadt)*

Anhalt *(Dessau)*

Süd *(Weißenfels)*

Federal State Sachsen-Anhalt

Area-Based Subsidies

3.800 Applicants

Yearly 650.000.000 DM
(332.000.000 Euro)

Legal Bases

Regulation No. 3508/92

Introduction of an Integratied Administration Control System (IACS)

Regulation No. 3887/92

Implementing Regulations to the IACS

Regulation No. 1593/2000

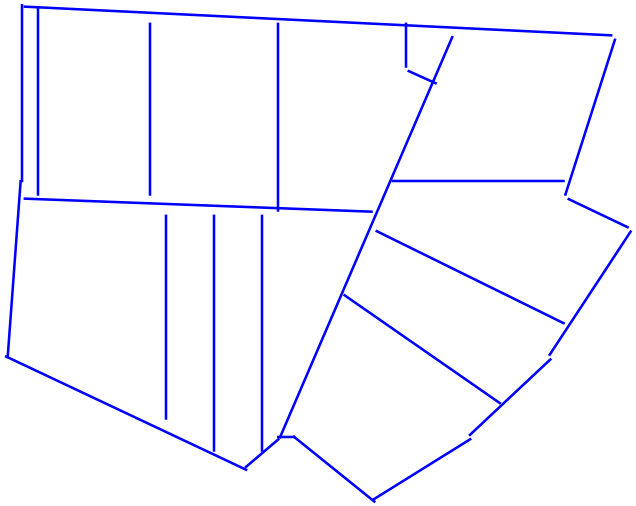
for Modification of Regulation No. 3508/92

Introduction of a Land Parcel Identification System
Using computer-based Technics for a Geographical Information System
Applicability of the System at latest at 1st of January 2005

Difficult Identification of Agricultural Parcels

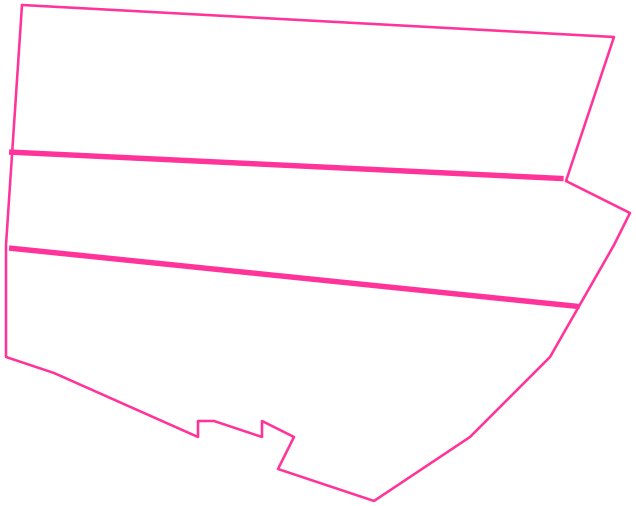
The applicant believes to run this areas:

12 agricultural parcels



Difficult Identification of Agricultural Parcels

He attaches the areas to this cadastral parcels :



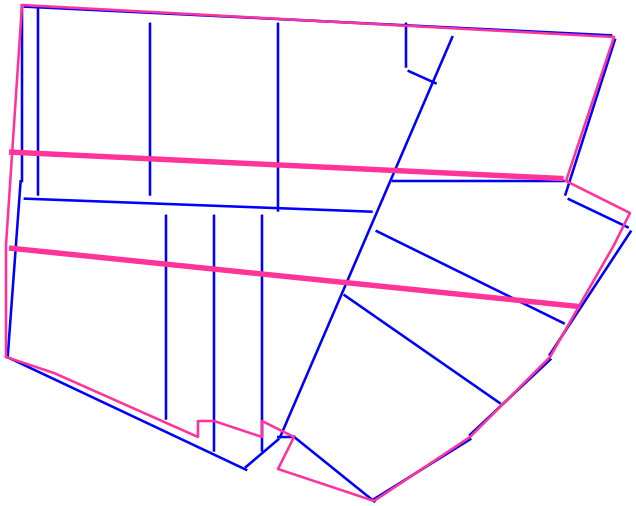
3 cadastral parcels

Difficult Identification of Agricultural Parcels

He took the cadastral parcels from a field map :

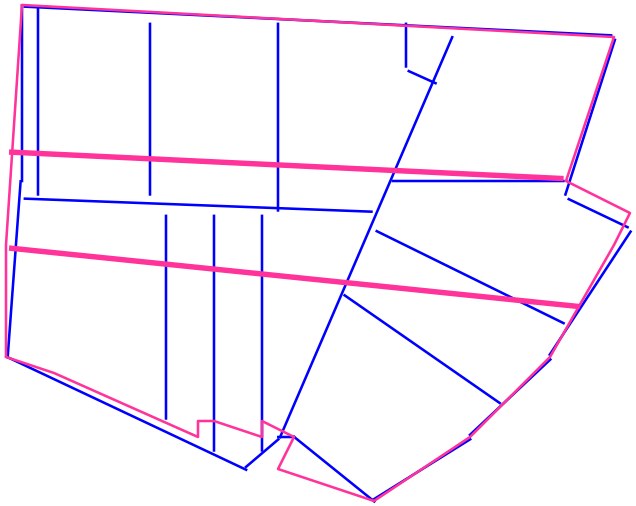
Difficult Identification of Agricultural Parcels

The cadastral parcels mismatch with the agricultural parcels :



Difficult Identification of Agricultural Parcels

Big expenditure on attaching the parts of the cadastral parcels :



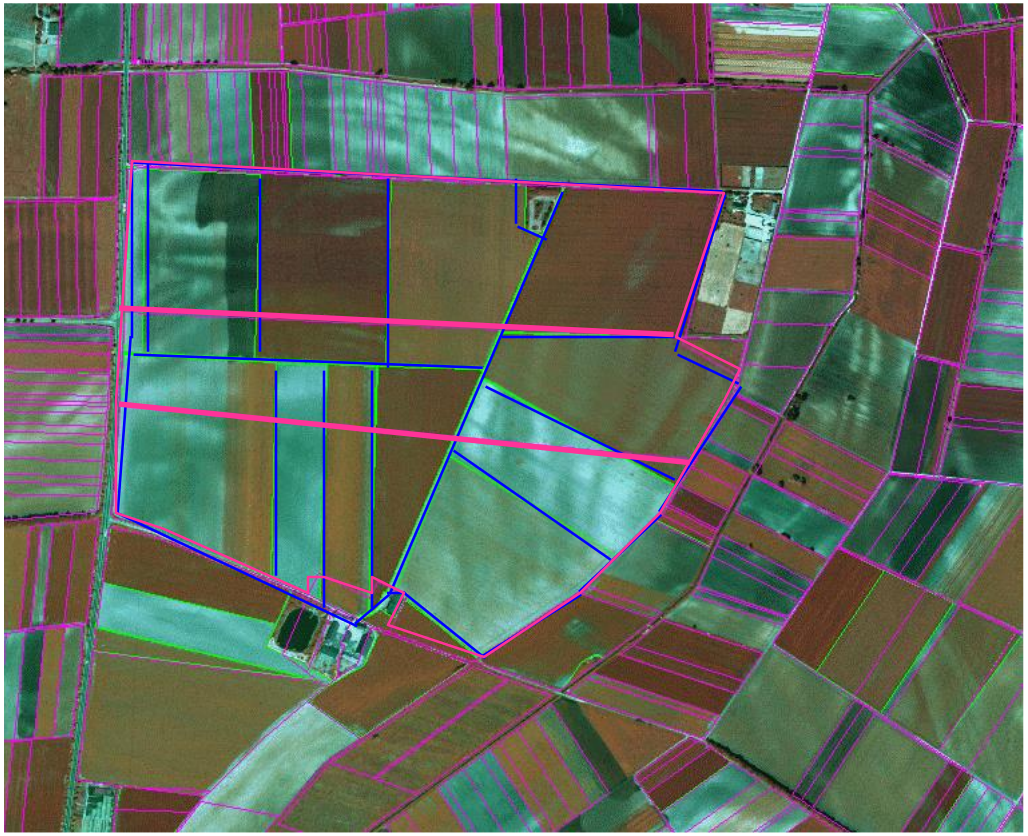
12 agricultural parcels

3 cadastral parcels

Divided to
23 parts of cadastral parcels !

Difficult Identification of Agricultural Parcels

Orthopictures show the real proportions :



Solution-Base

Since 1993 Controls with Remote Sensing in Sachsen-Anhalt

The company charged with the execution

- uses a GIS for the identification of the parcels
- uses digital Orthopictures for the exact defining of the surfaces
- digitalises the boundaries of the applied parcels

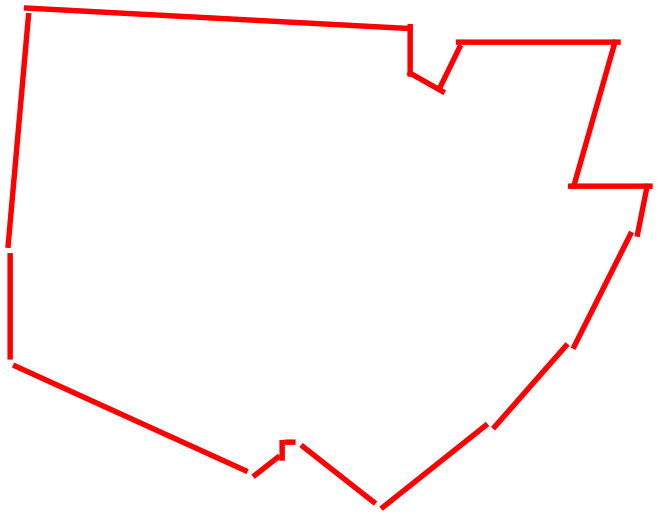
Solution-Base

Details of the IACS-GIS Project in Sachsen-Anhalt

- Digital Orthopictures for exact defining of location and surface
- Building up a digital cadastre of agricultural blocks as vector-data
- Integration of the digital vector-data cadastral map

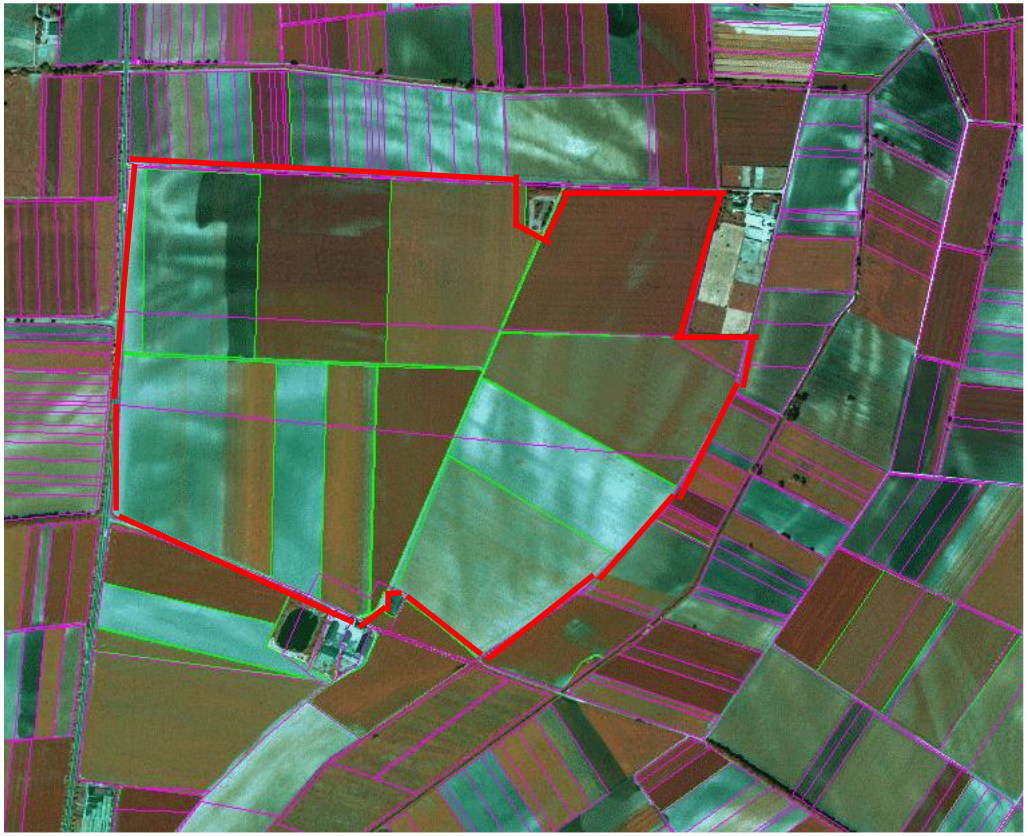
Solution-Base

Official digital vector-data agricultural block :



Solution-Base

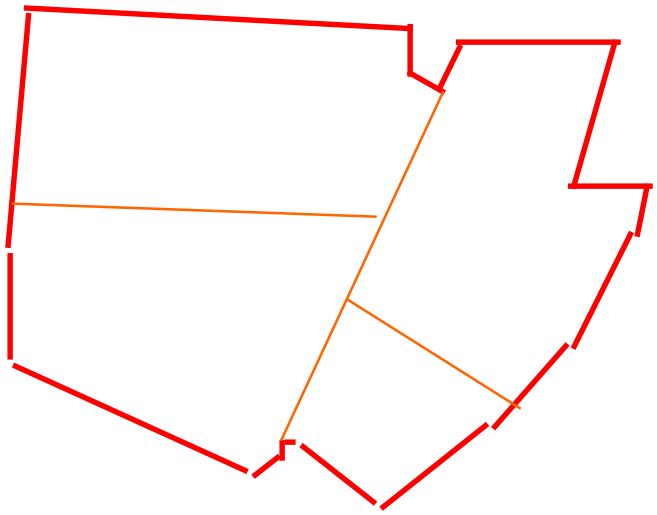
Official digital vector-data agricultural block :



Natural boundaries
for outside boundary

Solution-Base

Official digital vector-data agricultural block :

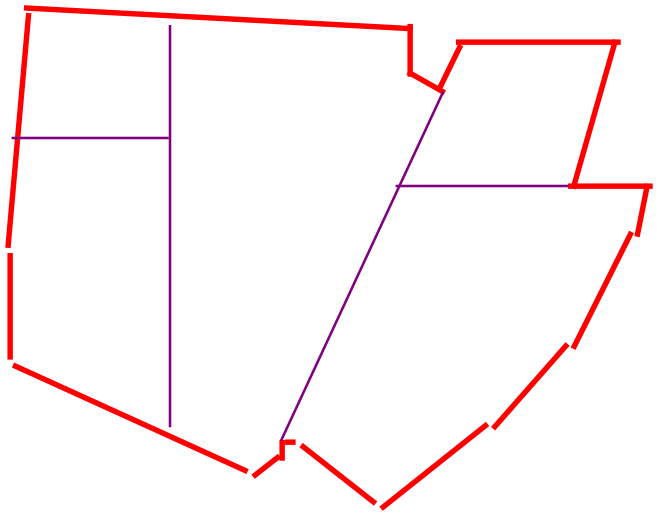


The inside boundaries change,
the outside boundary does not

2001

Solution-Base

Official digital vector-data agricultural block :

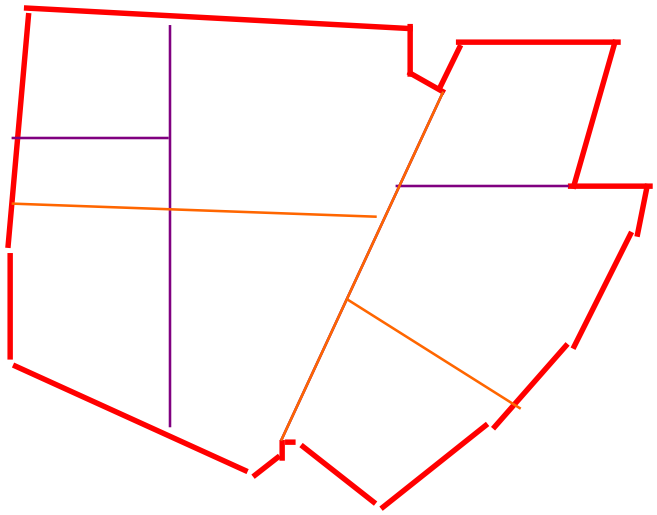


The inside boundaries change,
the outside boundary does not

2002

Solution-Base

Offical digital vector-data agricultural block :



The inside boundaries change,
the outside boundary does not

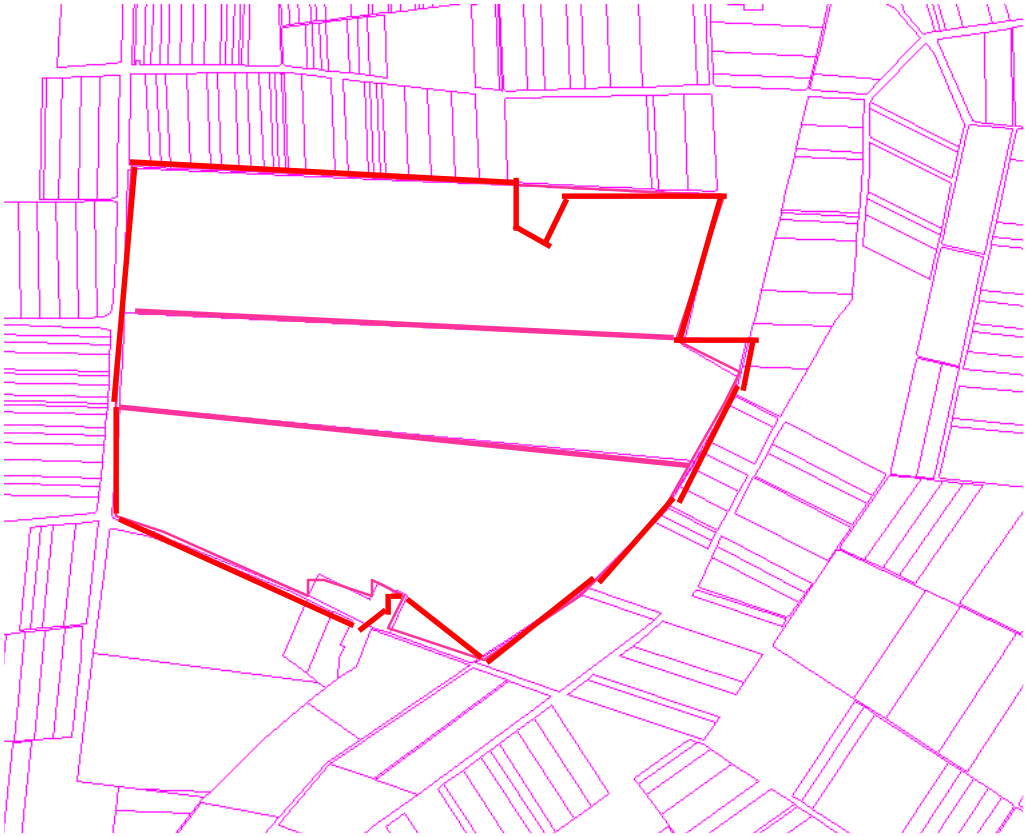
2001

+

2002

Solution-Base

Offical digital vector-data agricultural block :



Only once attaching the parts of the cadastral parcels

Using the digital vector-data cadastral map

Planning the Realization of the Project

Procurement of digital Orthopictures for the total surface

- The procurement will be finished until the beginning of 2001

Procurement of a special IACS-GIS

- Defining the requirements until the end of 2000
- Procurement procedure in the beginning of 2001

Building up a digital cadastre of agricultural blocks

- Peroid for building up from the middle of 2001 to the end of 2004
- Integration of the results of the controls with remote sensing

Adapting and simplifying of the procedures for applications

- Exchange of graphical data with the applicant or
- Using the offical agricultural block for the applications

Looking to the Future

Electronic Delivery of Applications via Internet

- Delivering the complete application by the applicant to the administration in electronical shape including a digital signature
- When the work of the administration with the application is finished, sending the checked data to the applicants as base for the applications of the next year
- Publishing the digital cadastre of agricultural blocks in the Internet

Land Parcel Identification System

Land Parcel Identification System
Extent of job

- Digitise **53,000** townlands and 3,000 District Electoral Divisions
- Digitise over **1 million** parcels
- Obtain aerial photography for entire country **- 4,000** prints
- Collect Ground control points for aerial rectification **- 1,200** points
- Produce orthophotography **- 26,000** tiles
- Build Oracle database for control and analysis of the data
- Supply farmers with maps of their holdings **- 300,000** A3 maps
- Building digital county grids for attaching 24,000 raster maps
- Building digital National Grid index for attaching 26,000 orthophotographs

Land Parcel Identification System

***The Computer* System**

Hardware

- 2 Servers with storage of 1000 GBytes
- PC workstations - being upgraded at present
- A3 printers

Software

- GIS engine …….. Microstation
- GIS software …….. Microstation Geographics
- Image Manipulation..HMR Descartes
- Operating System ….WindowsNT
- Database ……...Oracle V 8

Land Parcel Identification System

Aerial Photography

CGR of Italy flew country in June-July 1995

- Photography flown at 20,000 feet - 1:40,000 scale
- Overlap (generally) 60% along flight path, 10-15% lateral
- 4,000 contact prints
- GPS control for centre point of each photograph
- Quality assured by O.S.

Land Parcel Identification System

Orthophotography

Created by ATL / ADM, Israel

- Tile dimensions…. 2,000x1,500 metres
- Tile size ……. 3 Mbytes
- Number of Tiles….26,000 approx.
- Pixel size ……...1 metre
- Grid index ……..Same as OS NGrid
- DTM ……25 Metre intervals
- Format ……TIFF, HMR

Quality assurance by Geosys and O.S.

A countrywide Digital Terrain Model (DTM) was created during ortho rectification

Land Parcel Identification System

The drawbacks of Present System

- Topology is not done in real time
- Printing maps from a copy of database
- No definitive master copy of key data exists
- Data transfer between multiple data sources

Land Parcel Identification System

The Requirements of the proposed Re-engineered System

- Migration of GIS data to a spatial database
- A seamless spatial database
- Single access point for all data
- Dynamic topology
- Real time map printing
- Web Enabled Interface

Robert Lach – BALTIC CENTRE for G.I.S. office@bcgis.com.pl, www.bcgis.com.pl

Witold Fedorowicz-Jackowski – GEOSYSTEMS Polska office@geosystems.com.pl, www.geosystems.com.pl

Perspectives of usage of GIS and orthophotoes in Poland in relation to preparations to implementation of IACS system in Poland.

Brief summary

Approach to build IACS in a similar manner to methods used in the past by Member States would be not the best possible way in todays „third wave" times. „Second wave's" institutions use to think in a traditional way, extrapolating existing expenditure trends. Usage of GIS and orthophotoes diminishes costs of modernization of agricultural cadastre, while costs of modernization of rural cadastre with usage of traditional approach are socially unacceptable in Poland. Several Governments have tried to implement more advanced IT and GIS methotologies but only recently Prime Minister of Poland appointed interministerial team acting for elaboration and development of integrated cadastral system of Poland.
Council of Ministers of Poland decided to prepare our state for implementation of IACS system. Timeline of implementation and expenditures of initial stage of IACS implementation were determined at level of c.a.109 MEURO in February of 2000. This estimates did not take into account costs of conversion of cadastral maps of rural areas of Poland into digital form, which are supposed to be one of registers to base on, while building IACS in Poland. Therefore methodology of creation of digital borders of cadastral parcels was elaborated, on the basis of orthophoto production, which uses existing aerial photoes, with pixels resampled to 1 meter – the same as for IKONOS image products. Pilot projects for counties with diversified geographic and land structure conditions were executed in 1998,1999 and next are currently being planned.
There exists strong enough GIS community in Poland to take up the chellenge of integration of different GIS approaches to prepare Poland for EU accession on time.
Several recent projects will be shortly presented, including :

1. most complex softcopy project executed for Metropolitan Area of Warsaw with generation of DTM with 1m „z" accuracy,
2. integration of orthophotoes with cadastral maps for Powiat Czluchow (one of rural counties in Pomerania)
3. integration of IRS orthophoto with cadastral maps in mountaneaous area of Nowy Targ
4. precise orthorectification of IRS scenes with usage of TK-350

Conclutions from this recent works are being presented in relation to current implementaion plan of IACS in Poland. Wider perspective of usage of GIS and orthophotoes is presented in relation with achievements of other R&D Projects conducted by Ministry of Internal Affairs and Administraion no. PBZ-024-13 and Ministry of Agriculture and of Rural Development of Poland (PBZ-017-08), cofinnanced by Committee of Scentific Research of Poland.
Spacial attention is given to accuracy issues and Technical Recommendations to 2000 control campaign in relation to polish geographic and cadastral factors, determining future optimal approaches.
Details in conference paper and posters.

Land Parcel Management & Remote Sensing Control using Web enabled Technologies

Liam McGeown (e-Spatial Solutions Ltd)
John McMahon (e-Spatial Solutions Ltd)

ERA Maptec Ltd
Remote Sensing Specialists

e - Spatial Solutions
Land Information Systems

IACS Today

- The Integrated Administration and Control System (IACS) has a complex task of managing subsidies to farmers
- Many of the payments are now area based
- Spatial data is vital in the control system
- Many separate control systems
- GIS technologies have been used to manage spatial data sets within IACS, but has not been totally successful.
- Lack of real-time access and updating
- Time delays for integration of results of remote sensing control

IACS of the future

- Instant access to IACS data from any client
- On-line submission and up-dating applications by farmers
- Seamless integration of remote sensing control with IACS
- Inspectors have direct access to application and LPIS data in the field
- No waiting for results

ERA Maptec Ltd
Remote Sensing Specialists

e - Spatial Solutions
Land Information Systems

IACS Technology Limitations

- Separate data storage for graphic and attribute data
- Proprietary spatial database storage format
- Difficult to integrate with standard IACS systems
- Inability to transfer data between different systems
- Limited Scalability
- Specialist Programming Skills
- Limited hand held device capability
- Applications not deployed in standard Web Browsers

iSpatial Information Server, iSmart &Oracle i Technologies

- Complimentary database technologies
- Oracle 8i provides the core database storage technology
- iSpatial Information Server provides additional spatial database functions
- iSmart provides an on line Web application build and deployment environment without application source code.

Oracle 8i Technology

- Single Integrated Database Server for Spatial and Attribute Data
- Seamless Spatial Database
- Scalability & Performance
- Distributed and Replication Capability
- High Volume on-line Transaction processing environment
- Data management tools
- Standard SQL Query for spatial data

ERA Maptec Ltd
Remote Sensing Specialists

e - Spatial Solutions
Land Information Systems

iSpatial Information Server

- Integrated Spatial Database Topology Management
- Integrated completely with standard business systems
- No limitations to data transfer between different systems
- Full Integration of Spatial Data Query & Analysis Functions.
- Full Integration of Spatial EDIT & Reporting in the database
- All Applications deployed in standard Web browser

ERA Maptec Ltd
Remote Sensing Specialists

e - Spatial Solutions
Land Information Systems

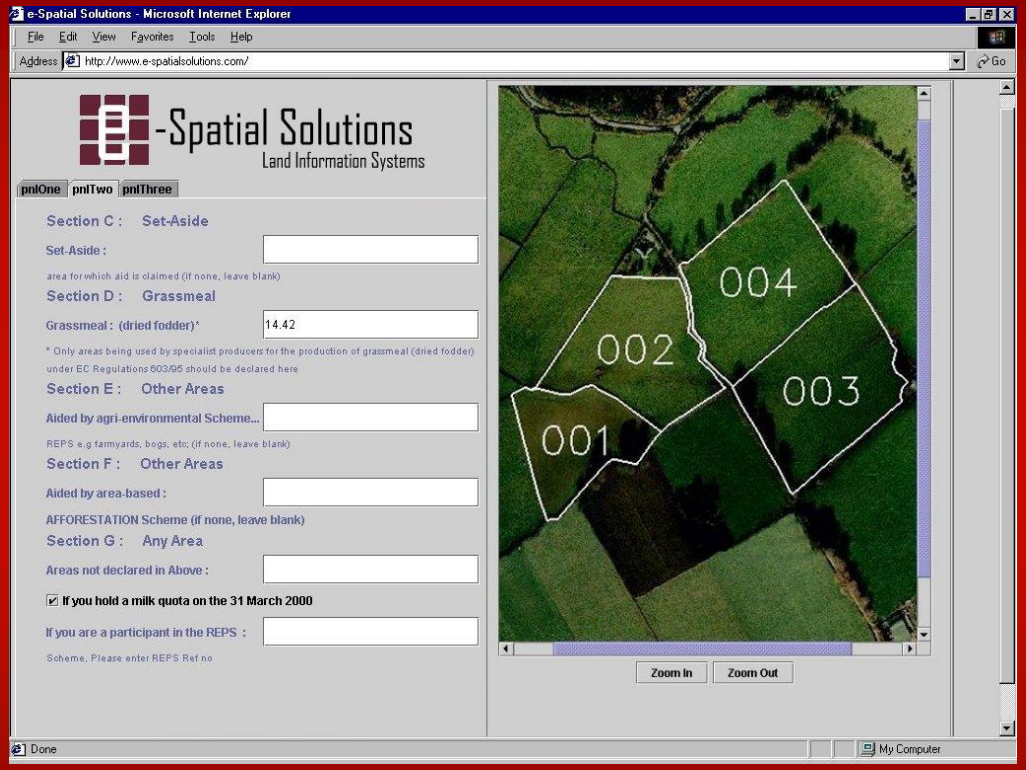
iSmart Application Server

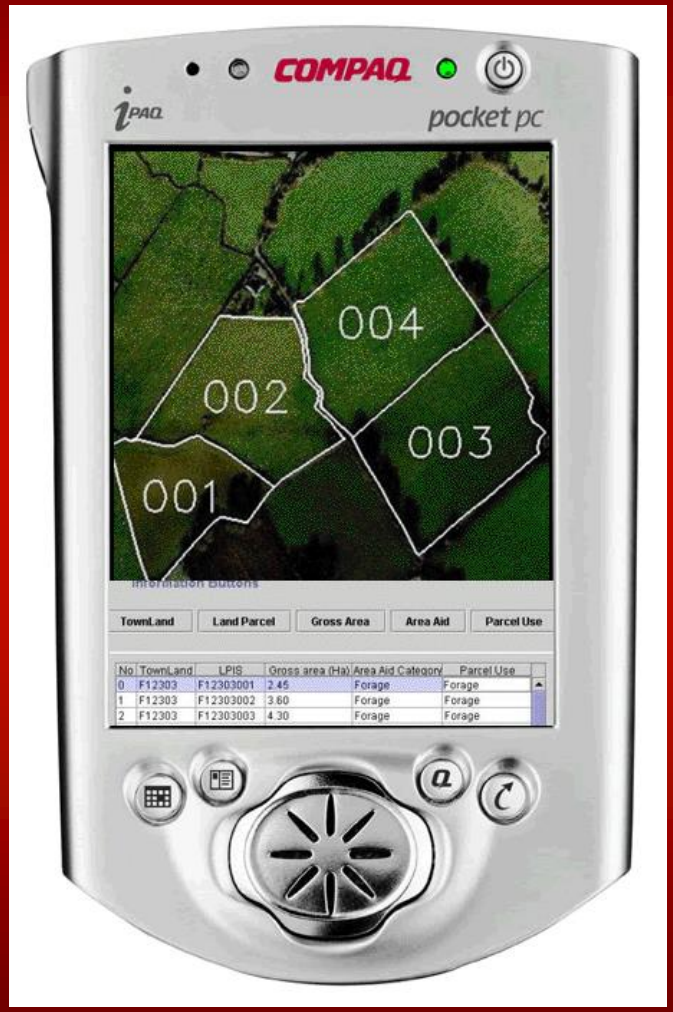
- Intelligent database environment for the real time design, build and deployment of Internet/Intranet applications without source code.
- Unique Microthin client (35k) that supports the deployment of unlimited number of applications on any device including Palm Pilots, 3G phones.
- No repetitive upload and download of client applet. i.e the iSmart client applet once downloaded will support all iSmart applications.
- iSmart eliminates all redundant code delivering application code on an as needed basis
- iSmart supports the seamless integration of existing applications

ERA Maptec Ltd
Remote Sensing Specialists

e - Spatial Solutions
Land Information Systems

Remote Data Access





ERA Maptec Ltd
Remote Sensing Specialists

e - Spatial Solutions
Land Information Systems

Spatial Information Server Demos

- Integration and Display of Colour and Ordnance Survey Greyscale Orthophoto images, Ordnance Survey 1:50,000 scale vector data administrative boundaries, land parcel boundaries using a standard Browser

- Integrated Department of Agriculture Standard Forms and Spatial Application with on line editing of spatial and standard attribute data from a standard Web browser. Also demonstrated will be real time database topology management

- Integrated Remote Sensing Control application with on line CAPI, diagnostics and results

- Modification and deployment of an existing forms application in real time.

ERA Maptec Ltd
Remote Sensing Specialists

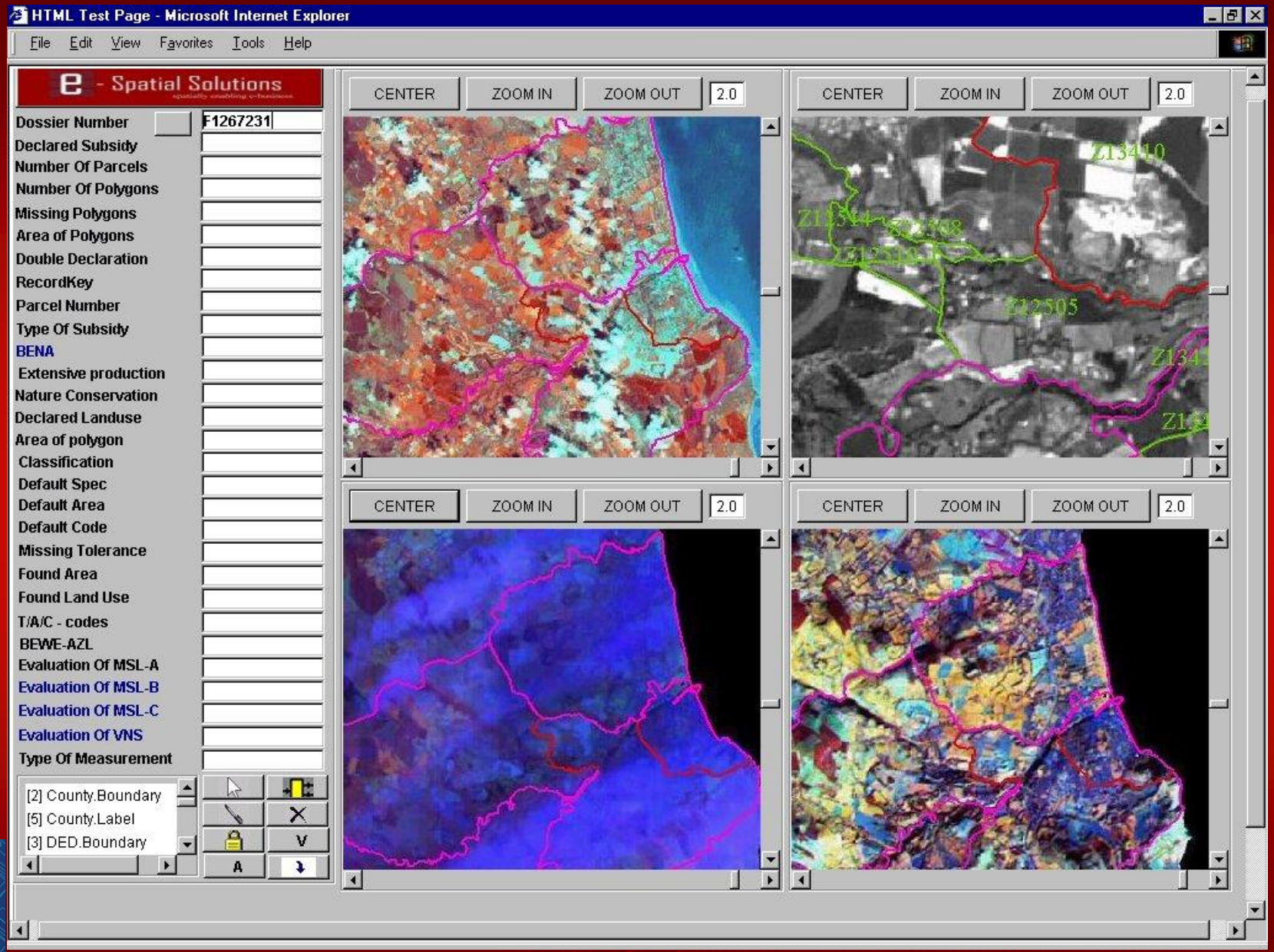
e - Spatial Solutions
Land Information Systems

Products

- iSpatial Information and iSmart Application Servers are available now
- Remote Sensing control module available 1st Qtr 2001

ERA Maptec Ltd
Remote Sensing Specialists

e - Spatial Solutions
Land Information Systems



ERA Maptec Ltd
Remote Sensing Specialists

e - Spatial Solutions
Land Information Systems

Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

6th Conference on CwRS
Dublin, 16 & 17 November 2000

Advances in Open System Solutions for distributed Control Tasks

Guido Lemoine & Richard Kidd

Control with Remote Sensing

Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

Introduction

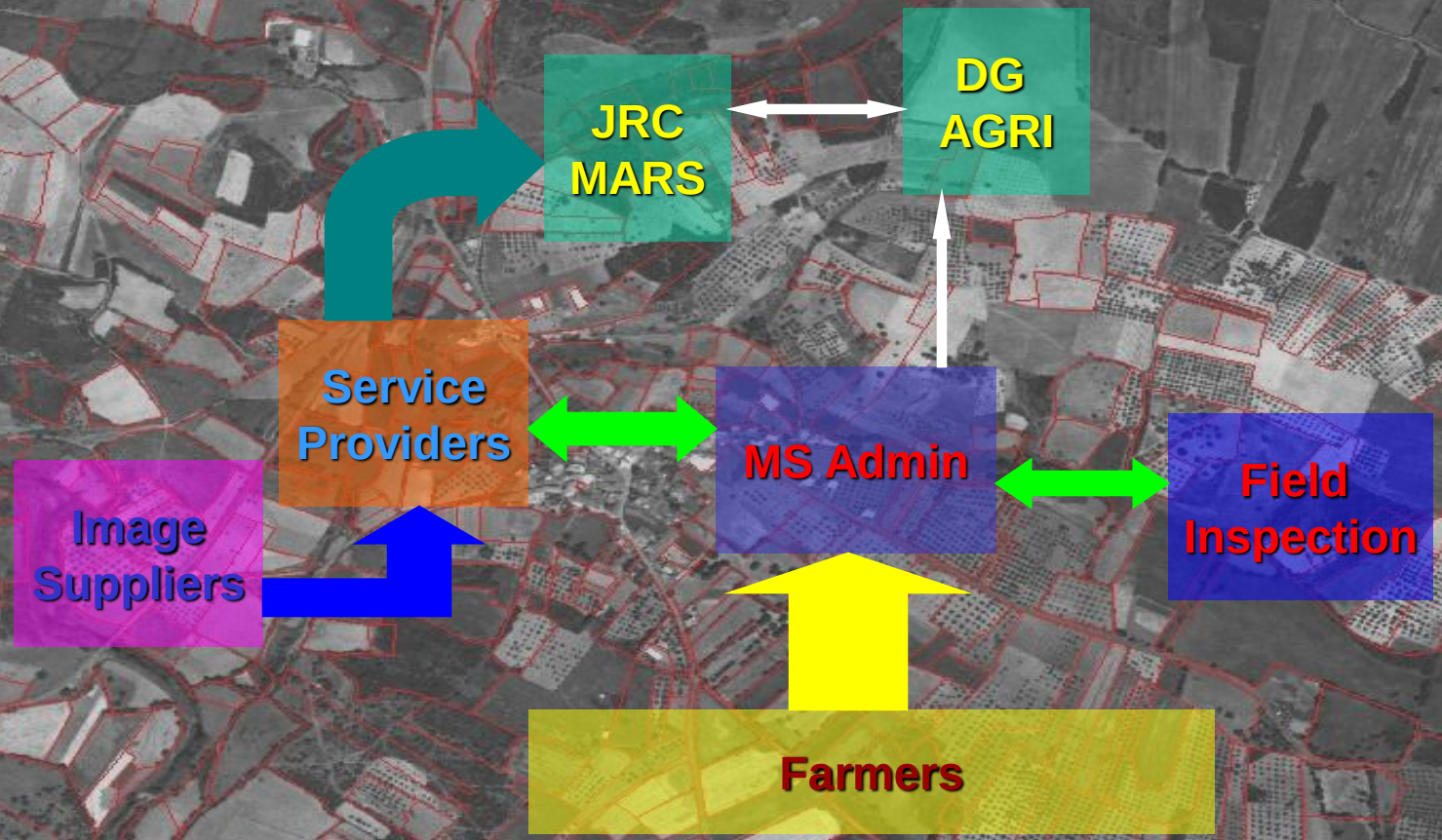
- Distributed image and geo-data workflow: EU CwRS case
- The role of WEB servers
- Why "Pure Java"?
- The applet-servlet configuration
- An ETM+ demonstration
- Future development
- Conclusions

Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

Control with Remote Sensing

Data flow



Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

WEB servers' role

- Distributed nature of the data flow
- Both data **serving** and **ingestion**
- Could significantly reduce delays
- Eliminate costly, error-prone digitisation
- Enforce common data standards, allowing fully transparent exchange
- Most of the "**intelligence**" on servers, fully configurable
- Client side can remain light-weight
- Potential to run on **mobile stations** (WAP?)

Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

Why Pure Java?

- Open source, easily and widely installed
- No vendor lock in...
- Object oriented, modular, easy to learn
- Extreme growth in functional APIs
- Global brainpower resources
- Network centric, beyond computers
- Performance problems largely solved

- Partly (but happy) coincidence (ION history)
- Needs perseverance, esp. for pioneer stuff

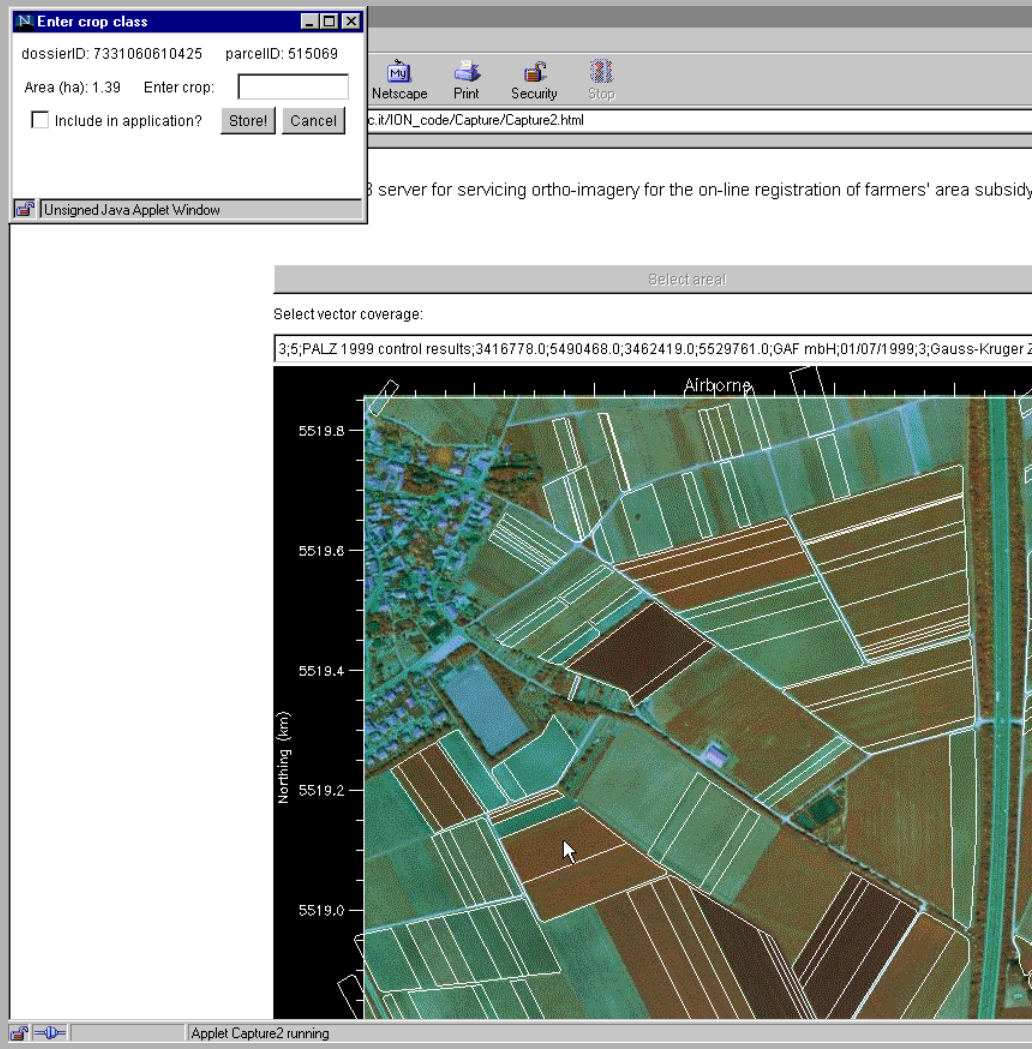
Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

Control with Remote Sensing

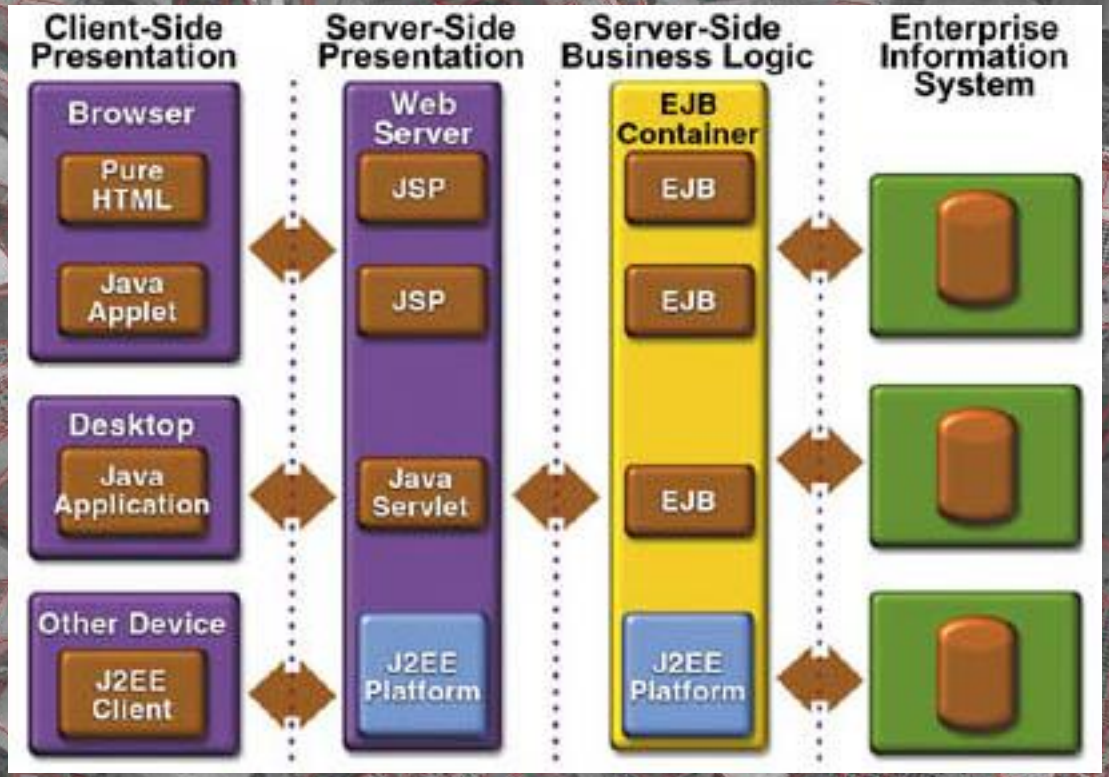
Pre-Pure Java

- ION 1.0-1.2
- Advanced graphics
- IDL code re-use
- ION-JAVA
- but...
- Server load
- Fire walls
- Versionitis



An applet-servlet configuration

- A J2EE "Enterprise" solution (without EJB)

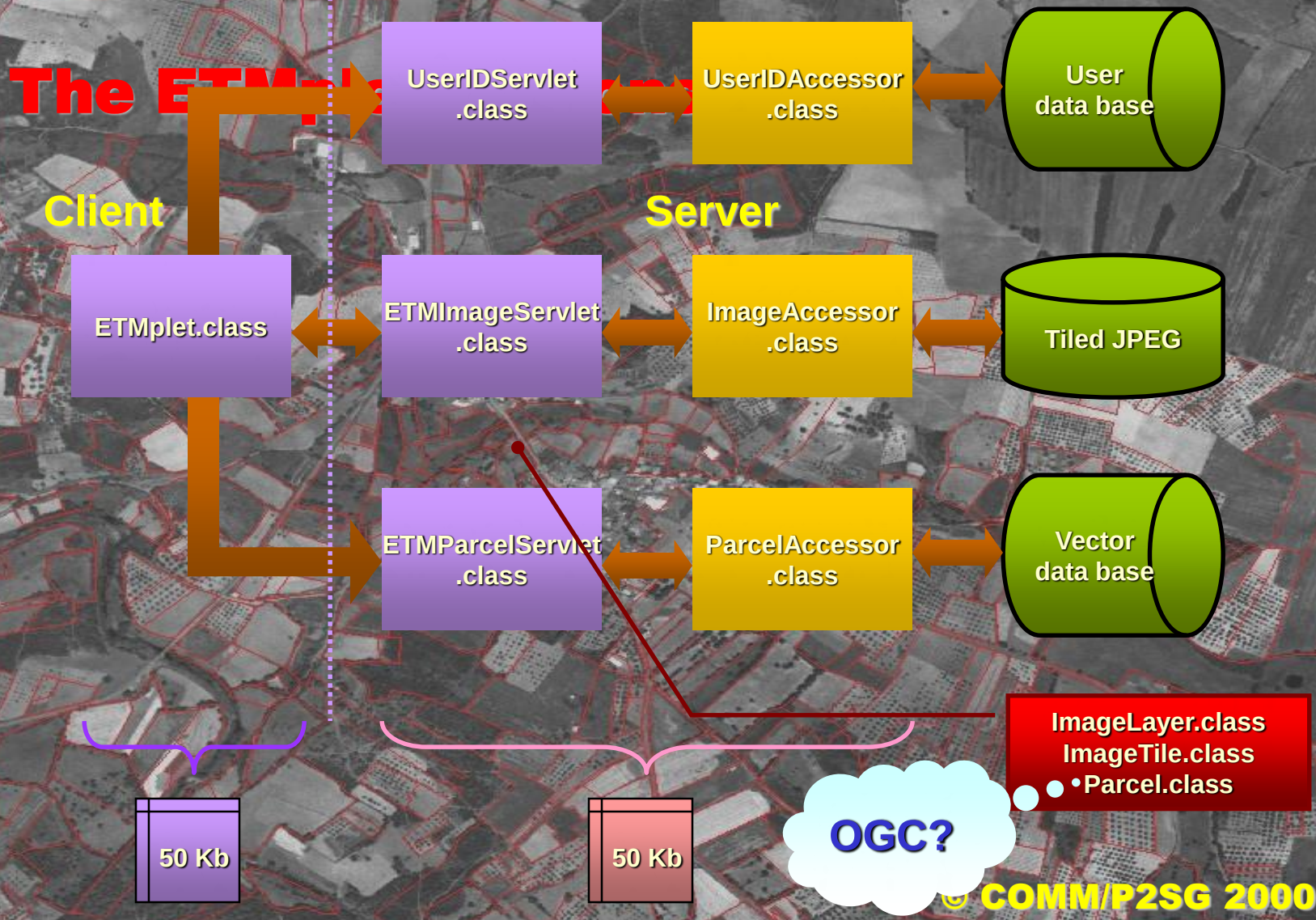


Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

Control with Remote Sensing

The ETM-I2



Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

JAVA APIs

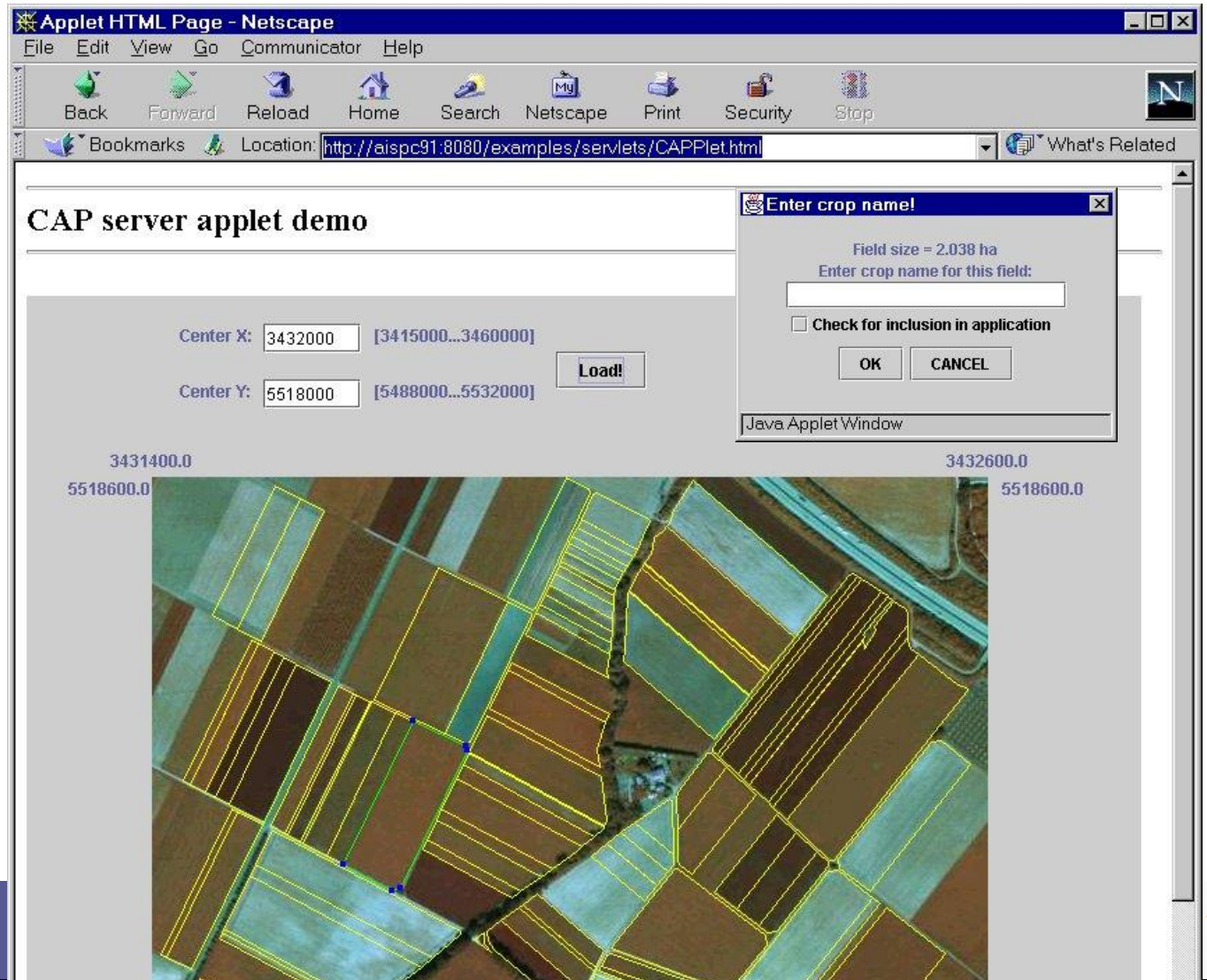
- Client is JApplet, but could (should) be application
- Servlets are based on javax.servlet.http.*
- JDBC-ODBC bridge data base connection, currently to MS Access (java.sql.*)
- Image file access with standard GIF loading and com.sun.image.codec.jpeg.*
- javax.swing.* (SWING) and java.awt.image.* java.awt.geom.* (JAVA 2D) APIs on client
- Browser needs Java 1.2 plug-in
- Server is tomcat (Apache Servlet Engine)

The ETMplet demonstrator

- Functionally simple, primitive GUI
- Image + editable vector layer
- ~ 200 by 300 km^2 15 m ETM+ PAN mosaic NL
- Original 380 Mb, 20 Mb tiled JPEG
- approximately 4,000 parcel vectors
- both single and multi-channel
- more at:

http://mars.aris.sai.jrc.it/nsam/ii/etmserver.html

CAPplet: selected data, editable vector



Space Applications Institute
JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

Future issues

- ***Things to do:***
- **Implementation of OpenGIS standards**
- **Stable, tested, documented prototype**
- **Testing in semi-operational context**
- **Small "innovation competition" budget**
- ***System-related***
- **Alternative FlashPix format or ECW codec**
- **Integration of JAI, esp. for image processing**
- **Data base migration to ProgreSQL**

Space Applications Institute

JOINT RESEARCH CENTRE
EUROPEAN COMMISSION

Conclusions

- Remarkably sophisticated graphical performance implementable in pure Java (Java3D is just out...)
- Data base and client-server approach allows centralised maintenance
- Very light-weight client (plug-in assumed)
- Easy to tailor applications, either Internet or intranet (!)
- Server solution allows completely new business concepts for EO and GIS use in agricultural mapping, potentially huge
- ***To be continued...***